

Arizona Prosecuting Attorneys' Advisory Council

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NOT DAUBERT?

Admissibility of Expert Opinion Testimony in Arizona

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NOT *Daubert*?
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Frye Gone?

- Two-prong test
 - Identify the “particular field” or relevant scientific community
 - Demonstrate that novel scientific evidence is generally accepted in that community

Daubert

- A little history
 - Plaintiff’s sought to use “experts” to prove that Bendectin could cause birth defects
 - District Court applied *Frye* analysis
 - Expert opinion based on a scientific technique is inadmissible unless the technique is generally accepted as reliable by the relevant scientific community
- HELD
 - Adoption of Federal Rules of Evidence superseded *Frye*

Basis of Rules of Evidence

- FRE 402
 - All relevant evidence is admissible...
 - Evidence which is not relevant is not admissible

Relevant Evidence

- FRE 401
 - has “any tendency to make the existence of any fact that is of consequence to the determination of the action more probable or less probable than it would be without the evidence”

True Daubert

- Actually a LIBERAL interpretation of Rule 702 FRE
 - Relaxes traditional barriers
 - Let good science in before generally accepted
- Does not mean no limits
- To the CONTRARY
 - Trial judge must ensure that scientific testimony or evidence admitted is
 - RELEVANT
 - RELIABLE
- FRE 702
 - Subject of expert's testimony
 - "scientific...knowledge"
- "Scientific"
 - Implies grounding in the methods and procedures of science
- "Knowledge"
 - Connotes more than subjective belief or unsupported speculation
- Science is not encyclopedic knowledge
 - Represents a process for proposing and refining theoretical explanations
 - Inference or assertion must be derived by scientific method
- FRE 702 further requires evidence or testimony to assist the trier of fact to understand the evidence or to determine a fact in issue
- Question of RELEVANCE
- Warning:
 - Scientific validity for one purpose is not necessarily scientific validity for other, unrelated purposes

Gatekeeper

- Judge determines at outset whether expert is proposing to testify to
 - Scientific knowledge, AND
 - That it will assist trier of fact to understand or determine a fact in issue
- Whether underlying reasoning or methodology is scientifically valid
- Whether reasoning or method properly can be applied to facts in issue

Some General Observations

- Has it been tested?
 - “Key question” to be answered in determining whether a theory or technique is scientific knowledge that will assist the trier of fact
- Peer review and publication
 - Publication is one part of peer review
 - Not *sine qua non* of admissibility
 - Does not correlate with reliability
 - Is component of good science
 - Relevant but not dispositive
- Known or potential rate of error
 - In case of particular scientific technique
- General acceptance
 - Still has bearing
 - *Frye* type analysis
 - Widespread acceptance can be important
 - Minimal support may be viewed with skepticism
- Flexible inquiry
 - Scientific validity
 - Thus evidentiary relevance and reliability
- FOCUS
 - Solely on principles and methodology
 - Not the conclusions they generate

- *Frye* focus on “novel” scientific techniques
- FRE 702 not restricted to unconventional evidence
- Well established propositions less likely to be challenged
 - May be subject to judicial notice
- Limits
 - FRE 403 permits exclusion of relevant evidence if probative value is substantially outweighed by danger of unfair prejudice, confusion of the issues or misleading the jury
- Vigorous cross-examination, presentation of contrary evidence and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence
- FRE 702 also applies to “technical or other specialized knowledge”

WHAT DOES ALL OF THIS MEAN?

- Scientists distinguish between
 - Validity
 - Does the principle support what it purports to show?
 - Reliability
 - Does application of the principle produce consistent results?
- Court looking to *evidentiary* reliability
 - Trustworthiness
- Case involving scientific evidence
 - *Evidentiary reliability* based upon *scientific validity*
 - Does principle support what it purports to show?

Daubert

- Trial judge must ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable

Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579 (1993)

- Court suggested a flexible, factor-based approach to analyzing the reliability of expert testimony
- Although not an exclusive list, these factors include:
 - whether a method can or has been tested
 - the known or potential rate of error
 - whether the methods have been subjected to peer review
 - whether there are standards controlling the technique's operation
 - the general acceptance of the method within the relevant community

All Expert Testimony

- Trial judge's responsibility to keep unreliable expert testimony from the jury applies to all expert testimony, not only to "scientific" testimony

Kumho Tire Co. v. Carmichael, 526 U.S. 137 (1999)

Kumho Tire

- "Basic gatekeeping obligation" applies with equal force in cases where "non-scientific" experts wish to relate specialized observations derived from knowledge and experience that is foreign to most jurors.
- Trial judge must have considerable leeway in deciding in a particular case how to go about determining whether particular expert testimony is reliable

True *Daubert*

- Majority emphasized that factors were neither exhaustive nor applicable in every case
 - Not presume to set out definitive checklist or test
 - Inquiry should be flexible
 - Used language of "may"
- CJ Rehnquist dissent
 - Concerned that factors would be applied strictly
- *Kumho Tire*
 - List of factors in *Daubert* meant to be helpful, not definitive

FRE 702 Amended

- Criteria:
 - (1) the testimony is based upon sufficient facts or data,
 - (2) the testimony is the product of reliable principles and methods, and
 - (3) the witness has applied the principles and methods reliably to the facts of the case.

FRE 702 Advisory Committee Notes 2000

- In response to *Daubert*, et al
 - Affirms gatekeeper role
 - Provides some general standards
 - Admissibility governed by Rule 104(a)
 - Proponent has burden of establishing that the pertinent admissibility requirements are met by a preponderance of the evidence
 - *Daubert* set up non-exclusive checklist in assessing the reliability of scientific evidence testimony

Who Trying to Prohibit

- Witnesses who lack proper qualifications
 - No specific expertise
 - Commentators
 - Knowledge only based on reading articles and surveying materials

What Really Trying to Prohibit

- Junk science
- Unorthodox practices not generally accepted
- Theories developed for litigation with no independent, objective support
 - Not supported by literature
 - No evidence methodology applied in reliable fashion

What Did AZ Get?
NOT *Daubert*?

AZ Rule 702

- If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise

§12-2203 Admissibility of expert opinion testimony

- Only a qualified witness may offer expert opinion testimony regarding
 - Scientific
 - Technical or
 - Other specialized knowledge
- Testimony is admissible if the court determines that **ALL** of the following apply
 - Witness is qualified...based on knowledge, skill, experience, training or education
 - Opinion will assist trier of fact in understanding the evidence or determining a fact in issue
 - Opinion based on sufficient facts and data
 - Opinion is product of reliable principles and methods
 - Witness reliably applies principles and methods to facts of case
- Court **SHALL** consider following factors, if applicable
 - Whether opinion and basis have been or can be tested
 - Whether opinion and basis have been subjected to peer reviewed publications
 - Known or potential rate of error of opinion and its basis
 - Degree to which opinion and basis are generally accepted in scientific community

Difference?

- **FRE 702**
 - If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, **may testify** thereto in the form of an opinion or otherwise, if
- **§12-2203**
 - Testimony **is admissible** if the court determines that **ALL** of the following apply
 - Witness is qualified...based on knowledge, skill, experience, training or education
 - Opinion will assist trier of fact in understanding the evidence or determining a fact in issue
- **FRE 702**
 - (1) the **testimony** is based upon sufficient facts or data,
 - (2) the **testimony** is the product of reliable principles and methods, and
 - (3) the witness has applied the principles and methods reliably to the facts of the case.
- **§12-2203**
 - **Opinion** based on sufficient facts and data
 - **Opinion** is product of reliable principles and methods
 - Witness reliably applies principles and methods to facts of case
- **FRE 702**
- **Flexible, factor-based** approach to analyzing the reliability of expert testimony
- Although **not an exclusive list**, these factors include:
 - whether a method can or has been tested
 - the known or potential rate of error
 - whether the methods have been subjected to peer review
 - whether there are standards controlling the technique's operation
 - the general acceptance of the method within the relevant community
- **§12-2203**
-
- Court **SHALL** consider following factors, **if applicable**
 - Whether opinion and basis have been or can be tested
 - Whether opinion and basis have been subjected to peer reviewed publications
 - Known or potential rate of error of opinion and its basis
 - Degree to which opinion and basis are generally accepted in scientific community

What Does This Mean for Arizona? Some Thoughts for Handling Evidentiary Challenges

Does Not Matter

- If the evidence is
 - Scientific
 - Technical
 - Specialized Knowledge
- Proponent has the burden of establishing that the pertinent admissibility requirements are met by a preponderance of the evidence
See Bourjaily v. United States, 483 U.S. 171 (1987)

What Proving?

- Proponents “do not have to demonstrate to the judge by a preponderance of the evidence that the assessments of their experts are correct, they only have to demonstrate by a preponderance of evidence that their opinions are reliable.”
In re Paoli R.R. Yard PCB Litigation, 35 F.3d 717, 744 (3d Cir. 1994)

Reliable v Correct

- The evidentiary requirement of reliability is lower than the merits standard of correctness
 - Court not required to determine which of several theories is best
In re Paoli R.R. Yard PCB Litigation, *supra*

Reliability v Scientific Validity

- D contends that breath test should not have been admitted because the Govt failed to present any evidence that the Intoxilyzer 5000 was a scientifically reliable device
- Avers that court should have required proof of scientific validity of the methodology by which the device measures blood alcohol content, using the standards for assessing the reliability of scientific evidence set forth in *Daubert*
- *Daubert* merely requires that the proffered scientific evidence be relevant and reliable
 - reliability of the methodology, that is, the **scientific technique** by which breathalysers measure breath alcohol content, is well established
United States v Daras, 164 F.3d 626 (4th Cir. 1998)

How Prove?

- FRE Rules amendment makes no attempt to set forth procedural requirements for exercising the trial court's gatekeeping function over expert testimony

§12-2203

- Only says that Court must consider the list of factors, if applicable

Mechanical Application?

- *Daubert* itself emphasized that the factors were neither exclusive nor dispositive
- Not all of the specific *Daubert* factors can apply to every type of expert testimony

What If?

- Witness has conducted no experiments
- Witness has written no articles
- Witness not know own error rates

If Applicable?

- Even nonscientific testimony must be screened for reliability, but such considerations as peer review and error rate are simply inapplicable to experience-based testimony
Living Designs, Inc. v. E.I. DuPont de Nemours & Co., 431 F.3d 353 (9th Cir. 2005)

Gang Case

- Defendant asserts that factors listed in *Daubert* as bearing on admissibility of scientific testimony should be applied mechanically to all expert testimony
- Police officer had specialized training in gangs and extensive experience, and based his opinions on information provided to him by gang members
 - Supreme Court has emphasized flexibility of *Daubert/Kumho* inquiry in different contexts
United States v. Hankey, 203 F.3d 1160 (9th Cir.), *cert. denied*, 530 U.S. 1268 (2000)

If Applicable?

- Lack of peer review or publication was not dispositive where the expert's opinion was supported by "widely accepted scientific knowledge"
Kannankeril v. Terminix Int'l, Inc., 128 F.3d 802, 809 (3d Cir. 1997)

Specialized or Technical

- Relevant reliability concerns may focus upon personal knowledge or experience
United States v Sandoval-Mendoza, 472 F.3d 645 (9th Cir. 2006)

Is Hearing Necessary?

- Long-accepted evidence
 - Court need not conduct full Daubert hearing on admissibility where
 - case law is overwhelmingly in favor of admitting [fingerprint experts] and
 - defendant provide no strong reason to rule otherwise
- U. S. v Pena*, 586F.3d 105 (1st Cir 2009)

Judicial Notice

- A trial judge need not expend scarce judicial resources reexamining a familiar form of expertise every time opinion evidence is offered
 - If given theory or technique is “so firmly established as to have attained the status of scientific law,” then it need not be examined at all
- Daubert*, 509 U.S. at 592, n.11

Gatekeeper Must be On-the-Record

- Need not hold separate hearing on expert testimony
 - May rule on objection during trial
 - But required to make specific, on-the-record findings that testimony is reliable
 - Conclusory statement not sufficient
- U. S. v Roach*, 582 F.3d 1192 (10th Cir 2009)

Bench v Jury

- Is there a difference when Gatekeeper is also the Fact Finder?
 - Less need for the gatekeeper to keep the gate when keeping the gate only for himself
- Allison v Mc-Ghan Med Corp.*, 184 F.3d 1800 (11th Cir. 1999)

Scientific Evidence

- Toxicology
- DNA
- GC/MS
 - Long accepted
 - “Gold standard”
 - Not even a Frye hearing

State v Lucero, 207 Ariz. 301, 85 P.3d 1059 (2004)

Specialized Knowledge

- Fingerprint
- Handwriting
- Toolmark
- Ballistics
- Medical
 - (§12-2604 notwithstanding)
- Law Enforcement Officers
 - SFST/HGN
 - Crash Reconstruction
 - Drug Trade

Value of Marijuana

- Narcotics agent to testify to value of marijuana
- Defendant argues
 - Agent's methods were not testable
 - Could not be reviewed for error rates
 - Resulting estimates were not generally accepted
- Test for admissibility under *Daubert* and *Kumho Tire* is flexible, and narcotics agent could testify based on his extensive experience

United States v. Mendoza-Paz, 286 F.3d 1104 (9th Cir.),
cert. denied, 537 U.S. 1038 (2002)

Application

- Where application, not validity, is challenged
 - Goes to weight of evidence
 - Not admissibility

State v Lucero, *supra*

Witnesses

Witness Qualification

- Nothing really changes
- Witness must be
 - Qualified
 - Testimony relevant

Dual Role of Witness

Fact v Opinion

- Same witness may present both fact and opinion evidence
- Can work both ways
 - Lay witness testify as an expert
 - Police officer with specialized knowledge/training
 - Expert witness testify as a lay witness
 - Testimony outside area of expertise

Dual Role Precautions

- Clarity of Roles
- Clear Foundations
- Opportunity for Cross-Exam

Beware Expert Commentators

- Knowledge based solely on reading articles and survey of materials from manufacturers
- Testimony excluded

United States v. Donat, No. 03-10620 (9th Cir. June 10, 2005) (unpublished)

Constitutional Challenge?

- AZ Constitution preserves the “right to have the jury pass upon questions of fact by determining the credibility of witnesses and the weight of conflicting evidence.”

Burton v Valentine, 60 Ariz. 518, 529, 141 P.2d 847, 851 (1943)
Cited, *Logerquist v McVey*, 196 Ariz. 470, 487, 1 P.3d 113, 130 (2000)

- The framers’ intent does not contemplate giving judges the power to determine reliability and credibility of a qualified expert as a prerequisite to submission of the expert’s conclusions to a jury for its determination of the weight to be given to the testimony.
- It would be strange that a judge forbidden to comment on the reliability or credibility of testimony would be empowered to preclude the jury from hearing the testimony at all because the judge believes it to be unreliable or not worthy of belief.
- Reduction or obliteration of the jury function may be seen by some as the ultimate tort reform, but it is one prohibited by our organic law.

Logerquist v McVey, 196 Ariz. 470, 487, 1 P.3d 113, 130 (2000)

Resources

<http://federalevidence.com/>
<http://www.daubertontheweb.com/>

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State of Arizona
Senate
Forty-ninth Legislature
Second Regular Session
2010

SENATE BILL 1189

AN ACT

AMENDING TITLE 12, CHAPTER 13, ARTICLE 1, ARIZONA REVISED STATUTES, BY ADDING
SECTION 12-2203; RELATING TO EVIDENCE.

(TEXT OF BILL BEGINS ON NEXT PAGE)

1 Be it enacted by the Legislature of the State of Arizona:
2 Section 1. Title 12, chapter 13, article 1, Arizona Revised Statutes,
3 is amended by adding section 12-2203, to read:
4 12-2203. Admissibility of expert opinion testimony
5 A. IN A CIVIL OR CRIMINAL ACTION, ONLY A QUALIFIED WITNESS MAY OFFER
6 EXPERT OPINION TESTIMONY REGARDING SCIENTIFIC, TECHNICAL OR OTHER SPECIALIZED
7 KNOWLEDGE AND THE TESTIMONY IS ADMISSIBLE IF THE COURT DETERMINES THAT ALL OF
8 THE FOLLOWING APPLY:
9 1. THE WITNESS IS QUALIFIED TO OFFER AN OPINION AS AN EXPERT ON THE
10 SUBJECT MATTER BASED ON KNOWLEDGE, SKILL, EXPERIENCE, TRAINING OR EDUCATION.
11 2. THE OPINION WILL ASSIST THE TRIER OF FACT IN UNDERSTANDING THE
12 EVIDENCE OR DETERMINING A FACT IN ISSUE.
13 3. THE OPINION IS BASED ON SUFFICIENT FACTS AND DATA.
14 4. THE OPINION IS THE PRODUCT OF RELIABLE PRINCIPLES AND METHODS.
15 5. THE WITNESS RELIABLY APPLIES THE PRINCIPLES AND METHODS TO THE
16 FACTS OF THE CASE.
17 B. THE COURT SHALL CONSIDER THE FOLLOWING FACTORS, IF APPLICABLE, IN
18 DETERMINING WHETHER THE EXPERT TESTIMONY IS ADMISSIBLE PURSUANT TO
19 SUBSECTION A:
20 1. WHETHER THE EXPERT OPINION AND ITS BASIS HAVE BEEN OR CAN BE
21 TESTED.
22 2. WHETHER THE EXPERT OPINION AND ITS BASIS HAVE BEEN SUBJECTED TO
23 PEER REVIEWED PUBLICATIONS.
24 3. THE KNOWN OR POTENTIAL RATE OF ERROR OF THE EXPERT OPINION AND ITS
25 BASIS.
26 4. THE DEGREE TO WHICH THE EXPERT OPINION AND ITS BASIS ARE GENERALLY
27 ACCEPTED IN THE SCIENTIFIC COMMUNITY.

Page 301

207 Ariz. 301 (Ariz.App. Div. 1 2004)

85 P.3d 1059

STATE of Arizona, Appellee,

v.

Ronald Michael LUCERO, Appellant.

No. 1 CA-CR 02-0739.

Court of Appeals of Arizona, First Division,
Department B.

March 23, 2004.

[85 P.3d 1060]

Page 302

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Amann, Assistant Attorney General, Phoenix Attorneys
for Appellee.

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By Tennie B. Martin, Deputy Legal Advocate, Phoenix
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OPINION

LANKFORD, Judge.

¶ 1 Defendant Ronald M. Lucero timely appeals his sentences and convictions for aggravated assault, possession of marijuana and drug paraphernalia, and four counts of endangerment.

¶ 2 This appeal raises three issues. Two issues concern the admissibility of evidence under *Frye v. United States*, 293 F. 1013 (D.C.Cir.1923). We must decide whether a *Frye* hearing was required before admitting scientific evidence based on gas chromatography/mass spectrometry ("GC/MS"). [1] We must also determine whether a *Frye* hearing was necessary before allowing an expert to testify that, in his opinion, marijuana impaired Defendant at the time of the accident. Finally, we decide whether a jury instruction unconstitutionally shifted the burden of proof to Defendant.

¶ 3 The charges against Defendant arose out of a collision between the vehicle Defendant was driving and another vehicle. Defendant had failed to yield the right of way. The State alleged that Defendant's use of marijuana

had impaired his ability to drive. A jury convicted Defendant on all counts.

¶ 4 The State introduced evidence of Defendant's impairment in part through the testimony of Raymond Kelly, a forensic toxicologist with a Ph.D. in chemistry. Dr. Kelly testified about the results of GC/MS tests performed on blood and urine samples taken from Defendant after the collision. [2] Defendant's blood tested positive for tetrahydrocannabinol ("THC"), [3] the active component in

[85 P.3d 1061]

Page 303

marijuana, and for metabolites of THC. [4] Defendant's urine also tested positive for a metabolite of THC. THC is a central nervous system depressant.

¶ 5 Defendant requested a pretrial *Frye* hearing. He challenged the admissibility of the GC/MS tests and Dr. Kelly's opinion testimony regarding Defendant's alleged impairment. Defendant argued that the testing methods were "faulty," and produced a scientific journal article to support this contention. [5] Defendant also argued that no scientific evidence demonstrated that his ability to drive safely had been impaired by the levels of THC found in Defendant's system. The superior court denied the motion, held no *Frye* hearing, and at trial admitted the evidence.

¶ 6 We have jurisdiction pursuant to Article 6, Section 9, of the Arizona Constitution and Arizona Revised Statutes sections 12-120.21(A)(1) (2003), 13-4031 (2001), and 13-4033(A) (2001). We affirm because the superior court did not err in admitting the evidence or in instructing the jury.

¶ 7 The evidence of the GC/MS test results were not subject to a *Frye* hearing. This scientific method is not novel. It has long been not only generally accepted, but praised for its accuracy.

¶ 8 The admissibility of certain scientific evidence in Arizona is determined by the *Frye* standard. *Logerquist v. McVey*, 196 Ariz. 470, 490, ¶ 62, 1 P.3d 113, 133 (2000). *Frye* requires that the scientific principles and the techniques of their application be shown to be "generally accepted in the relevant scientific community" before first being accepted as evidence. *State v. Bible*, 175 Ariz. 549, 578, 858 P.2d 1152, 1181 (1993).

¶ 9 A *Frye* hearing is not required every time scientific evidence is offered. A *Frye* determination is required only for new, novel or experimental scientific evidence. *Logerquist*, 196 Ariz. at 475, ¶ 19, 1 P.3d at 118; *State v. Varela*, 178 Ariz. 319, 325-26, 873 P.2d

657, 663-64 (App.1993). It is therefore not necessary to subject evidence to a *Frye* analysis if the evidence does not rely on novel scientific principles or techniques. *Varela*, 178 Ariz. at 325-26, 873 P.2d at 663-64. We review the decision on whether to hold a hearing pursuant to *Frye* for an abuse of discretion. *Id.* at 326, 873 P.2d at 664.

¶ 10 Although no Arizona cases declare explicitly that GC/MS results are admissible, GC/MS technology has long been accepted by the courts and used by scientists as a standard analytic method. More than a decade ago, we noted that the reported accuracy rate of this method in drug detection is 99.99 percent and that it was a standard drug testing procedure. *Weller*, 176 Ariz. at 222, 225, 860 P.2d at 489, 492. In fact, the GC/MS method has been used to test for drugs since the 1960s. *State v. Sercey*, 825 So.2d 959, 961 n. 1 (Fla.Dist.Ct.App.2002) (citations omitted). The method is so widely accepted that even the article relied upon by Defendant in this case states that "[m]ost toxicologists consider GC/MS as the 'gold standard' for forensic testing...." [6] Test results

[85 P.3d 1062]

Page 304

obtained by this method are widely admitted by courts. [7]

¶ 11 Defendant nevertheless challenged the evidence based on GC/MS analysis, requesting a *Frye* hearing to determine its admissibility. The absence of a reported Arizona opinion expressly approving this scientific method does not confer an automatic right to a hearing. Evidence relying on this method has long been admitted in Arizona courts and has been accepted in the scientific community for drug testing even longer. "By its own words, *Frye* applies to the use of *novel* scientific theories or processes to produce results." *Logerquist*, 196 Ariz. at 475, ¶ 19, 1 P.3d at 118 (emphasis added). Defendant only attacked the validity of GC/MS testing; he did not argue that it was a novel method of scientific analysis. On the contrary, Defendant conceded that the method is not new. As a result, no separate pretrial *Frye* hearing was required. *State v. Morgan*, 204 Ariz. 166, 174, ¶ 32, 61 P.3d 460, 468 (App.2002).

¶ 12 This is not to say that, once admitted, scientific evidence is forever after unassailably admissible. After all, some theories once generally accepted ultimately have been rejected in favor of new ones. Quantum physics, for example, has changed scientists' understanding of the nature of energy and matter, including Einsteinian theories which in turn had challenged earlier Newtonian ideas. In a perhaps more vivid example, Ptolemy's idea that the sun revolves around the Earth held sway for centuries, until Nicolaus Copernicus and Galileo Galilei demonstrated otherwise.

¶ 13 But Defendant's challenge of the scientific method's accuracy falls far short of such a shift in scientific archetypes. To earn the right to a *Frye* hearing on previously accepted scientific evidence, the party opposing its admissibility must preliminarily demonstrate that the method "is no longer accorded general scientific acceptance." *State v. Esser*, 205 Ariz. 320, 324, ¶ 11, 70 P.3d 449, 453 (App.2003). [8] See generally Bert Black et al., *Science and the Law in the Wake of Daubert: A New Search for Scientific Knowledge*, 72 Tex. L.Rev. 715 (1994) (discussing means of establishing scientific acceptance). Cf. *State v. Harris*, 152 Ariz. 150, 152, 730 P.2d 859, 861 (App.1986) (to be entitled to a *Frye* hearing, a party opposing the scientific method must be "supported by authorities indicating that there may not be general scientific acceptance of the technique employed."). In *Esser*, we said that it is not enough to produce scientific opinion challenging the accuracy of the evidence. 205 Ariz. at 324, ¶ 12, 70 P.3d at 453. "The question is not whether the scientific community has concluded that the scientific principle or process is absolutely perfect, but whether the principle or process is generally accepted to be capable of doing what it purports to do." *Id.* (internal quotations and citation omitted).

¶ 14 Defendant's attack on GC/MS did no more than demonstrate that test procedures or interpretation of test results can be faulty. [9] But these are not *Frye* issues,

[85 P.3d 1063]

Page 305

because they relate to the application of the science and not its validity. And any argument that the scientific method is not infallible goes to weight, not admissibility. See *Esser*, 205 Ariz. at 324, ¶ 13, 70 P.3d at 453 (challenge to accuracy of breath alcohol testing device goes to weight of test results, not admissibility under *Frye*).

¶ 15 In summary, the superior court was not required to conduct a *Frye* hearing. Neither the absence of prior approval of GC/MS in reported Arizona opinions nor Defendant's attack necessitated a *Frye* hearing. Defendant failed to show either that the challenged evidence was a novel scientific method or was a formerly accepted method newly fallen into disrepute in the scientific community.

¶ 16 Defendant's second evidentiary challenge focuses on Dr. Kelly's opinion testimony. Dr. Kelly testified that, in his opinion, Defendant was impaired by marijuana at the time of the collision. Defendant argues that a *Frye* hearing was required to admit this opinion evidence.

¶ 17 A *Frye* hearing was not required to admit opinion evidence of this nature. Dr. Kelly opined that the levels of THC or its metabolites found in Defendant's body signify impairment of his ability to drive a motor

vehicle safely. His testimony relied on no novel scientific principles. Instead, he provided an opinion based on his knowledge and experience as a forensic toxicologist. Such testimony is subject not to *Frye*, but to the general rules of admissibility regarding expert opinion evidence.

The admissibility of such testimony, if challenged, is governed by the Arizona Rules of Evidence including Rule 702 (testimony must assist trier of fact), Rule 703 (data upon which expert bases opinion must be of "a type reasonably relied upon by experts in the particular field"), and Rule 403 (Relevant evidence may be excluded if its "probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury.").

State ex rel. Romley v. Fields, 201 Ariz. 321, 328, ¶ 23, 35 P.3d 82, 89 (App.2001) (footnote and citation omitted).

¶ 18 Dr. Kelly testified that when marijuana is ingested, the concentration of THC in the blood increases rapidly, peaks, and then decreases rapidly to an undetectable level. However, the level of THC metabolites increase as the body processes the THC. The metabolites are detectable in the blood long after THC cannot be found. The absence of THC in the blood does not mean that the body is unaffected, however. Even when THC is no longer detectable in the blood, it remains for a time in the nervous system and continues to affect the user. It affects judgment, the ability to think, and the ability to solve problems. It can make the ability to perform multiple tasks, such as those performed while driving, difficult. Adverse effects endure as long as twenty-four hours after consumption.

¶ 19 Defendant argues that the superior court erroneously denied his request for a *Frye* hearing because the effects of marijuana were a matter of "human behavior," not scientific theory. That argument was squarely rejected by our supreme court in *Logerquist*, which held that expert testimony based on observations of behavior are not subject to a *Frye* test. 196 Ariz. at 480, ¶ 30, 1 P.3d at 123. Defendant also contends that Dr. Kelly's testimony that Defendant was impaired at the time of the accident was based solely on "his interpretation and extrapolation of the results of a scientific process, GC/MS." That the data upon which Dr. Kelly based his opinion were obtained scientifically does not render his opinion inadmissible or subject to *Frye* unless such use were [85 P.3d 1064] itself a novel technique. See *State v. Tankersley*, 191 Ariz. 359, 364-65, ¶ 14, 956 P.2d 486, 491-92 (1998) (new application of scientific principle is subject to *Frye*).

¶ 20 Defendant did not demonstrate that using test results and observed behavior to draw inferences about the effect of the drug on behavior was novel. Dr. Kelly did not, for example, utilize a formula that purports to relate quantities of THC metabolites with particular

levels of impairment. Use of a mathematical formula to correlate test results with degree of impairment might well be a novel technique. But the record in this case reflects neither that Dr. Kelly relied on such a formula nor that such a formula is a new scientific method of analysis. On the contrary, Dr. Kelly repeatedly testified that a specific blood level of THC or its metabolites cannot be correlated either to a level of impairment in general or to a level of driving impairment in particular.

¶ 21 Instead, Dr. Kelly relied upon his experience and knowledge of these facts: (1) the recency of Defendant's ingestion of marijuana; (2) police reports describing the collision and Defendant's behavior consistent with marijuana impairment; and (3) published studies relating consumption of marijuana and impairment of driving ability for as long as three hours later. His opinions therefore were admissible under Rules 702 and 703 of the Arizona Rules of Evidence. See *Logerquist*, 196 Ariz. at 477-78, ¶ 23, 1 P.3d at 120-21. See also *State v. Hyde*, 186 Ariz. 252, 276, 921 P.2d 655, 679 (1996) (admission of expert testimony is reviewed for abuse of discretion). The jury was entitled to hear his opinion about Defendant's impairment, and then give it the weight the jury believed that testimony merited. [10] The superior court did not abuse its discretion in refusing to hold a *Frye* hearing before admitting Dr. Kelly's opinion testimony.

¶ 22 Finally, Defendant argues that an improper jury instruction denied him a fair trial because it effectively shifted the burden of proof to him. The trial court gave the following jury instruction: "The defendant is not required to produce evidence of any kind. The decision whether to produce any evidence is left to the defendant acting with the advice of an attorney. The defendant's failure to produce any evidence is not evidence of guilt." Defendant concedes that he made no objection below, but asks us to review for fundamental error. See *State v. Schrock*, 149 Ariz. 433, 440, 719 P.2d 1049, 1056 (1986).

¶ 23 Although we fail to see how this instruction placed any burden on Defendant, Defendant waived his claim of error by requesting the following instruction:

The State must prove guilt beyond a reasonable doubt with its own evidence. The defendant is not required to produce evidence of any kind. The decision on whether to produce any evidence is left to the defendant acting with the advice of an attorney. The defendant's failure to produce any evidence is not evidence of guilt.

With the exception of the exclusion of the first sentence and the word "on," the instruction given to the jury is identical to that sought by Defendant. [11]

[85 P.3d 1065]

Page 307

¶ 24 The instruction was not discussed or otherwise

addressed in the record. The only source for this instruction is Defendant's request.

¶ 25 When a party requests a jury instruction, that party waives the right to challenge the instruction on appeal, even if the instruction is erroneous. *State v. Logan*, 200 Ariz. 564, 565, ¶ 8, 30 P.3d 631, 632 (2001). In such a case, we do not consider whether any alleged error is fundamental. *Id.* at 565-66, ¶ 9, 30 P.3d at 632-33.

¶ 26 Accordingly, we affirm Defendant's convictions and sentences.

CONCURRING: DONN KESSLER, Judge and DANIEL A. BARKER, Judge.

Notes:

[1] A description of GC/MS testing is as follows:

The gas chromatograph, which is essentially an extremely sensitive filtering machine[,] is instrumental in breaking down a gas sample or a liquid mixture into its molecular subcomponents. If, for example, an individual wanted to ascertain the molecular compounds in a particular liquid, the sample would be mixed with a liquid solvent. The mixture is then heated until it forms a gas. The gas is then forced through a column, which is a glass tube filled with special filtration material. Each molecular compound in the sample will elute through a given column and temperature at a specific rate. A detector is attached at the outgoing end of the column which records the quantity and concentration of each particular molecular compound contained in the sample.

During this process, a mass spectrometer may be used in conjunction with the gas chromatograph. A mass spectrometer bombards the sample with high-energy electrons to generate extensive fragmentation ions. Because the sample is broken up to such a degree, the equipment can accurately determine which compounds are present. Using [gas chromatography and mass spectrometry] simultaneously yields information about the sample with a high specificity level.

Peter Joseph Bober, *The "Chemical Signature" of the Fourth Amendment: Gas Chromatography/Mass Spectrometry and the War on Drugs*, 8 Seton Hall Const. L.J. 75, 79-80 (1997). See also Jefferson Lankford, *Arizona DUI: A Manual for Police, Lawyers, and Judges* 59-62 (2003-2004 ed.) (2003) (describing gas chromatography).

[2] A total of four biological samples were analyzed: one urine sample and three blood samples taken at different times. GC/MS testing was performed on all but one of the samples after an initial screening test and resulted in detecting the presence of THC or its metabolites in all

three samples. The quantities of these substances detected were minute, measured in nanograms per milliliter of blood or urine. A nanogram is one billionth of a gram.

[3] Nothing in the human body produces THC; THC occurs naturally only in the *Cannabis sativa*, or marijuana, plant.

[4] A metabolite is "any substance produced by metabolism or by a metabolic process." Dorland's Illustrated Med. Dictionary 942-43 (25th ed.1974). "[C]annabinoid metabolites [are] the byproducts created by the body's interaction with the chemical ingredients of marijuana." *Weller v. Ariz. Dep't of Econ. Sec.*, 176 Ariz. 220, 222, 860 P.2d 487, 489 (App.1993).

[5] Alan H.B. Wu, Ph.D. et al., *Minimal Standards for the Performance and Interpretation of Toxicology Tests in Legal Proceedings*, 44 J. Forensic Sci. 516 (1999).

[6] Wu, *supra*, 44 J. Forensic Sci. at 521. See Edward J. Imwinkelried, *Should the Courts Incorporate a Best Evidence Rule Into the Standard Determining the Admissibility of Scientific Testimony?: Enough is Enough Even When It is Not the Best*, 50 Case W. Res. L.Rev. 19, 32 (1999) ("GC/MS is the 'gold standard,' widely regarded as the 'most accurate' and 'most reliable' analytic technique."); *Sercey*, 825 So.2d at 961 n. 1 ("GC/MS analysis is generally accepted in the scientific community as the best method for determining the presence and quantity of THC and [THC metabolites] in blood."). See also Lankford, *supra*, at 61 ("Because of its accuracy of measurement and ability to screen out alcohol compounds other than ethanol, gas chromatography is considered the state of the art forensic test for blood alcohol content."). Dr. Kelly also testified in this case that GC/MS testing is accepted by the scientific community as an accurate and reliable means to detect and determine the level of drugs in biological samples.

[7] *People v. DeLuna*, 334 Ill.App.3d 1, 267 Ill.Dec. 778, 777 N.E.2d 581, 600 (2002) ("[A]ppellate courts time and again deal with and accept GCMS testing in controlled substance cases...."). See also, e.g., *Goebel v. Warner Transp.*, 612 N.W.2d 18, 22 n. 3 (S.D.2000) ("In fact, surveys have rated [] GC/MS as 'nearly infallible.' ") (citing *Taylor v. O'Grady*, 888 F.2d 1189, 1192 n. 4 (7th Cir.1989)); *Commonwealth v. Martin*, 427 Mass. 816, 696 N.E.2d 904, 907 n. 5 (1998) ("Gas chromatography mass spectrometry 'is, for all practical purposes, 100% accurate.' ") (quoting *Pella v. Adams*, 702 F.Supp. 244, 246 (D.Nev.1988)). And the United States Supreme Court, discussing drug findings confirmed by GC/MS, has said that as long as the tests are properly conducted, GC/MS tests detect drugs in biological samples with "great accuracy." *Skinner v. Ry. Labor Executives' Ass'n*, 489 U.S. 602, 610 n. 3, 109 S.Ct. 1402, 103 L.Ed.2d 639 (1989).

[8] We apply the de novo standard of review to this

proposition, the same as that applied to review the opposite proposition: "[W]e conduct a de novo review to determine whether a scientific principle used as a basis for expert testimony is generally accepted in the relevant scientific community." *Bible*, 175 Ariz. at 578, 858 P.2d at 1181.

[9] Even that is a generous view of Defendant's evidence. The sole article on which Defendant relied states: "Disputes have erupted between prominent toxicologists and laboratory scientists as to the validity and interpretation of the data presented." Wu, *supra*, 44 J. Forensic Sci. at 516. But this statement does not refer to GC/MS tests. It only refers generally to "toxicological analyses and interpretations of blood, urine, and other specimens for drugs of abuse." *Id.* At most, the authors caution that test protocols must be observed and results properly interpreted:

Most toxicologists consider GC/MS as the "gold standard" for forensic testing, and most attorneys consider results as irrefutable. However, GC/MS can have limitations depending upon the mode of operation, the experience of the operator performing the test, and the toxicologist interpreting the results. Data can be manipulated to arrive at an erroneous conclusion.

Id. at 521.

[10] Unlike the test results produced by the GC/MS analysis, expressed with an exquisite precision measured in nanograms, the opinion of Dr. Kelly was not "scientific evidence [that] is a source of particular judicial caution. Because 'science' is often accepted in our society as synonymous with truth, there is a substantial risk of overweighting by the jury." *Bible*, 175 Ariz. at 578, 858 P.2d at 1181 (internal quotations and citations omitted). This testimony was ordinary expert opinion, subject to admissibility challenges by Defendant on the bases provided by the rules of evidence and to arguments to the jury on the weight to be accorded to the evidence.

[11] The superior court also gave the following instruction on reasonable doubt:

The State has the burden of proving the defendant guilty beyond a reasonable doubt. This means the State must prove each element of the each charge beyond a reasonable doubt. In a civil case it is only necessary to prove a fact is more likely true than not or that its truth is highly probable. In a criminal case such as this the State's proof must be more powerful than that. It must be beyond a reasonable doubt. Prove [sic] beyond a reasonable doubt is proof that leaves you firmly convinced of the defendant's guilt.

There are very few things in this world that we know with absolute certainty and in a criminal case the law does not require proof that overcomes every doubt. If based on your consideration of the evidence, you're firmly convinced the defendant is guilty of a crime

charged, you must find him guilty. If on the other hand you think there's a real possibility the defendant is not guilty, you must give him the benefit [of] the doubt and find him not guilty.

Page 470

196 Ariz. 470 (Ariz. 2000)

1 P.3d 113

Kim E. LOGERQUIST, a single woman, Petitioner.

v.

Hon. Michael R. McVEY, Judge of the Superior Court of the State of Arizona, in and for the County of Maricopa, Respondent Judge, John T. Danforth, M.D. and Mary Jean Danforth, his wife; John T. Danforth, P.C., Real Parties in Interest.

No. CV-98-0587-PR.

Supreme Court of Arizona.

April 19, 2000

[1 P.3d 114]

Page 471

Turley, Swan & Childers, P.C. By: Kent E. Turley, Phoenix, Attorneys for Petitioner.

Teilborg, Sanders & Parks, P.C. By: Frank A. Parks, Kari B. Zangerle, Donald A. Lawson, Phoenix, Attorneys for Real Parties in Interest.

En Banc.

OPINION

FELDMAN, Justice.

¶ 1 Applying the rule of *Frye v. United States*, 293 F. 1013 (D.C.Cir. 1923), the trial judge entered an order precluding "expert testimony of Plaintiff's alleged repressed memory." We granted review to clarify Rule 702, Arizona Rules of Evidence, which governs the admission of opinion testimony.

¶ 2 The construction and application of Rule 702 has become an issue of nationwide concern following the United States Supreme Court's opinion in *Daubert v. Merrell Dow Pharmaceuticals*, 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993). *Daubert* and its progeny reject the *Frye* test and construe Rule 702, Federal Rules of Evidence, to create a "gatekeeper" function for federal judges. The question of whether to apply *Frye* or *Daubert* to Ariz.R.Evid. 702 appears with increasing frequency and creates uncertainty in this and many other cases pending in our trial courts. To settle this policy question for Arizona courts, we take the rare step of reviewing the

propriety of the trial court's interlocutory order. See *Piner v. Superior Court*, 192 Ariz. 182, 184-85, 962 P.2d 909, 911-12 (1998); *Summerfield v. Superior Court*, 144 Ariz. 467, 469, 698 P.2d 712, 714 (1985). We have jurisdiction under Arizona Constitution art. VI, § 5(4).

[1 P.3d 115] FACTS AND PROCEDURAL HISTORY

¶ 3 Kim Logerquist (Plaintiff) alleges that her pediatrician (Defendant) sexually abused her on several occasions between 1971 and 1973, when she was eight to ten years old. Plaintiff further alleges that she had amnesia about those events until 1991, when her memory was triggered by watching a television commercial featuring a pediatrician. She sought "to introduce evidence, through expert testimony, that severe childhood trauma, including sexual abuse, can cause a repression of memory, and that in later years this memory can be recalled with accuracy." Minute Entry Order, June 11, 1998, at 1 (hereafter June 11 Order).

¶ 4 Over objection, the trial judge granted Defendant's motion that a *Frye* hearing be held to assess the admissibility of expert testimony regarding repressed memory. Two experts testified at this hearing. Plaintiff called Dr. Bessell van der Kolk, a clinical psychiatrist who specializes in dissociative amnesia. He testified regarding the large number of patients who alleged such phenomenon and about his diagnoses of dissociative amnesia or post-traumatic stress disorder in such patients. He would testify, among other things, that his experience and observations over many years, together with the extensive literature on the subject, have led him to conclude the phenomenon exists in some patients. Defendant's expert, Dr. Richard Kihlstrom, a research psychologist, testified there were serious flaws in the many studies supporting repressed memory and cited other studies finding trauma usually enhances memory rather than causes amnesia. Doctor Kihlstrom did not, however, have any personal experience treating or dealing with people claiming to suffer from repressed memory; nor had he participated in any studies on trauma's effect on memory.

¶ 5 After a lengthy hearing, the trial judge determined the "theories advanced by Plaintiff's experts are not generally accepted in the relevant scientific community of trauma memory researchers." June 11 Order, at 4. The judge therefore "ORDERED excluding expert testimony of Plaintiff's alleged repressed memory, and Plaintiff's theory that such evidence can be recalled with accuracy." *Id.*

¶ 6 Because this interlocutory order was not appealable, Plaintiff sought review by special action in the court of appeals. See Rule 1, Arizona Rules of Procedure for Special Actions. The court of appeals

declined jurisdiction, and Plaintiff sought review by this court. We granted review for the reasons stated at the beginning of this opinion, allowed supplemental briefing, and heard oral argument. The first question accepted for review was whether *Frye* or *Daubert* applied. We conclude *Frye* was inapplicable and reject *Daubert* as it has been interpreted in the cases that have followed it. [1] We now vacate the order excluding expert testimony.

DISCUSSION

A. Contentions of the parties

¶ 7 Plaintiff contends the June 11 Order, based on the *Frye* principle, is incorrect because *Frye* is inapplicable. If the *Frye* test were applicable to the evidence Plaintiff seeks to adduce, Plaintiff argues that it should be discarded in favor of *Daubert*'s test of reliability. Defendant, on the other hand, believes that *Frye* applies to the testimony and the trial judge correctly concluded the principles explained by Doctor van der Kolk had not gained general acceptance, so that expert testimony regarding these principles was therefore inadmissible. In the event *Frye* is found to be inapplicable or is abandoned by this court, Defendant argues that the *Daubert* test should be applied and the trial judge had discretion as "gatekeeper" to preclude the evidence.

¶ 8 Other courts have reached conflicting decisions on these questions. *See, e.g.*

[1 P.3d 116] *Shahzade v. Gregory*, 923 F.Supp. 286 (D.Mass.1996) (applying *Daubert* but finding general acceptance and admitting evidence); *Wilson v. Phillips*, 73 Cal.App.4th 250, 86 Cal.Rptr.2d 204 (1999) (*Frye* inapplicable, testimony like Dr. van der Kolk's admissible under expert evidence rule); *Doe v. Shults-Lewis Child & Family Serv., Inc.*, 718 N.E.2d 738, 750 and n. 1 (Ind.1999) (applying *Daubert* but refusing "to declare repressed memory syndrome unreliable"); *New Hampshire v. Hungerford*, 142 N.H. 110, 697 A.2d 916 (1997) (applying *Frye* and precluding evidence); *New Mexico v. Alberico*, 116 N.M. 156, 861 P.2d 192 (N.M.1993) (applying *Daubert* but finding general acceptance and admitting evidence); *Rhode Island v. Quattrocchi*, 1999 WL 284882 (R.I.Super. April 26, 1999) (applying *Frye* and precluding evidence); *Moriarty v. Garden Sanctuary Church of God*, 334 S.C. 150, 511 S.E.2d 699 (App.1999) (dissociative amnesia or repressed memory syndrome valid theory under South Carolina standard for admission of scientific evidence).

B. Proceedings in the trial court

¶ 9 We think it necessary to focus on the precise controversy as defined by the record before the trial court. Plaintiff's complaint, filed more than twenty years after the incidents and ten years after Plaintiff became an adult, initially raised questions regarding timeliness. The trial judge first granted Defendant's motion to dismiss on

the basis that the action was barred by the statute of limitations. Our court of appeals reversed that order, without resolving the *Frye* issue, and remanded for proceedings not inconsistent with its opinion. *Logerquist v. Danforth*, 188 Ariz. 16, 23-24, 932 P.2d 281, 288-89 (App.1996). We denied review, with Justice Martone voting to grant.

¶ 10 On remand, and after extensive discovery, Defendant filed a Motion for Evidentiary Hearing Pursuant to *Frye v. United States* (hereafter *Frye* Motion). Defendant argued that Plaintiff's case is based on scientific theories that are not readily accepted by the medical and scientific communities. Further, he contended the memories alleged were not real or accurate but had been distorted, implanted, or suggested by improper techniques used by the physician and psychologist treating Plaintiff for emotional problems. Because the "medical community is unwilling to make a statement that there is scientific foundation for the accuracy of Ms. Logerquist's claims, it would be inappropriate to allow her to proceed forward to trial." *Frye* Motion at 14 (emphasis added).

¶ 11 In response, Plaintiff objected to a *Frye* hearing. As permitted by Ariz.R.Evid. 702, Plaintiff's treating doctors would testify to experience and observation with this and many other cases dealing with repressed memory, dissociative amnesia, and post-traumatic stress disorder. Even if they gave general testimony based on the literature covering the subject, and if such testimony were subject to *Frye*, they could show general acceptance need not be non-controversial or universal. Conceding that not all allegedly recovered memories are accurate or truthful, Plaintiff argued that the question of the accuracy and credibility of her recollection was for the jury.

¶ 12 In his reply to Plaintiff's response to the *Frye* Motion, Defendant argued that:

Plaintiff alleges she suffers from dissociative amnesia.... The manual in which 'Dissociative Amnesia' is defined also indicates:

There are no tests or set of procedures that invariably distinguish Dissociative Amnesia from Malingering, but individuals with Dissociative Amnesia usually score high on standard measures of hypnotizability and dissociative capacity. Malingered amnesia is more common in individuals presenting with acute, florid symptoms in a context in which potential secondary gain is evident—for example, financial or legal problems....

Care must be exercised in evaluating the accuracy of retrieved memories, because the informants are often highly suggestible. *There has been considerable controversy concerning amnesia related to reported physical or sexual abuse, particularly when abuse is alleged to have occurred during early childhood. Some*

clinicians believe that there has been an underreporting of such events, especially

[1 P.3d 117]

because the victims are often children and perpetrators are inclined to deny or distort their actions. However, other clinicians are concerned that there may be overreporting, particularly given the unreliability of childhood memories. There is currently no method for establishing with certainty the accuracy of such retrieved memories in the absence of corroborative evidence.

Replies in Support of His Motion for Evidentiary Hearing Pursuant to *Frye* (quoting AMERICAN PSYCHIATRIC ASSOCIATION, DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS IV § 300.12 (1994) (hereafter DSM-IV)).

¶ 13 These pleadings were followed by a veritable blizzard of paper. Having received a witness list naming Doctor van der Kolk as Plaintiff's independent (non-treating) expert, Defendant sought by motion to preclude Doctor van der Kolk from testifying about the results of animal studies. A separate motion sought to preclude the doctor from giving any testimony that relied on his own clinical experience. These were accompanied by a motion to preclude Doctor van der Kolk from relying on the literature listed in his letter to Plaintiff's counsel. [2] Defendant also moved to preclude the testimony of Plaintiff's treating doctors, sought an order permitting him to provide additional material to assist the court in its evaluation of Doctor van der Kolk's testimony, and moved to strike an affidavit filed in opposition to Defendant's motion for summary judgment because it contained expert opinion.

¶ 14 Defendant argued that expert opinion was inadmissible, no matter what its basis or the subject to which it was directed--whether repressed memory, dissociative amnesia, or post-traumatic stress disorder. Defendant maintained that view in arguing to this court. Plaintiff's position, on the other hand, was set forth in her response to Defendant's Memorandum to Assist the Court in Evaluating the Admissibility of Expert Evidence:

This Response shows that Dr. van der Kolk's personal experiences and observations in treating hundreds of survivors of childhood sexual abuse (CSA) that have total or partial amnesia of the CSA are not subject to the *Frye* rule. The Response will further show that Dr. van der Kolk should be allowed to testify ... that when some CSA victims do have delayed memories, that their memories are as reasonably accurate as normal memories, if not better.

¶ 15 Doctor van der Kolk's February 8, 1998 letter to counsel gives an even better picture of what Defendant sought to preclude:

I hereby accept you[r] invitation to testify.... I intend to

testify that amnesia for traumatic experiences, including for sexual abuse, has been documented in numerous scientific reports for over a century, and that this notion is, in fact, so well accepted in the relevant scientific community that it has not only been incorporated in the Diagnostic and Statistical Manual of Mental Disorders of the American Psychiatric Association within the very criterion set for Post Traumatic Stress Disorder, but also under a separate rubric of Dissociative Amnesia. It has been further amplified in the official statement of the American Psychiatric Association on Memories of Childhood Sexual Abuse. I am the Director of the Trauma Center in Brookline, MA, which specializes in the treatment and research of individuals who suffer from the psychological effects of trauma. I have conducted numerous studies on the nature of the human response to trauma, including specifically on memory processes in responses.

¶ 16 The letter then listed some of the articles and books Doctor van der Kolk planned to rely on in his testimony. The extensive bibliography that followed has been described in footnote 2, *supra*. Included were cites to seven items written by Doctor

[1 P.3d 118]

Page 475

van der Kolk himself. Almost all were articles published in prestigious, peer-reviewed journals such as the HARVARD REVIEW OF PSYCHIATRY and the AMERICAN JOURNAL OF PSYCHIATRY. Doctor van der Kolk's qualifications were also of record. See Appendix A. They clearly establish his extensive education, training, and experience in psychology and psychiatry and specifically in the study and treatment of dissociative amnesia.

¶ 17 It is apparent we are not dealing with an alchemist attempting to change lead into gold or an astrologer predicting events from the movements of the stars but one of the leading researchers and authorities in behavioral science. It would be strange that a witness so well qualified and experienced would not be permitted to testify on an issue beyond the experience of the average juror. Nevertheless, the trial judge's June 11 Order was quite broad. He first cited to DSM-IV § 300.12 "to support [Plaintiff's] contention that dissociative amnesia is generally accepted in the relevant scientific community." However, the judge noted, that same section provides the cautionary note previously quoted in ¶ 12. After reviewing similar cautionary notes in other studies, the judge concluded:

Finally, this Court has carefully considered the various studies relied upon by Plaintiff's expert. Studies in the area of the effect of trauma upon memory are in their infancy. This Court has concluded that these studies contain serious methodological flaws, and that these

flaws have prevented Plaintiff's theory from being generally accepted in the relevant scientific community of trauma memory researchers. These methodological flaws include, but are not limited to, inadequate sample sizes, gender bias, consideration of other reasons for loss of memory (i.e., infantile amnesia), and perhaps most importantly, independent corroboration that the event alleged to have been forgotten, actually occurred. [3]

For the reasons set forth above, this Court has concluded that the theories advanced by Plaintiff's experts are not generally accepted in the relevant scientific community of trauma memory researchers. Therefore,

IT IS ORDERED *excluding expert testimony* of Plaintiff's alleged repressed memory, and Plaintiff's theory that such evidence can be recalled with accuracy.

June 11 Order (emphasis added).

¶ 18 As Defendant indicated at argument, this order not only precluded Doctor van der Kolk's testimony but effectively precluded that of Plaintiff's treating physicians. Even assuming Plaintiff would be allowed to testify about her memory, this left her in the pragmatically impossible situation of having no evidence to support her testimony but nevertheless having to persuade the jury that she had suffered dissociative amnesia and that her recall could have been accurate. On the other hand, Defendant would presumably be able to call his expert to testify that Plaintiff's recollection was incredible or, at best, inaccurate. The preclusion order, in other words, as effectively took the case from the jury as if the judge had granted summary judgment or directed a verdict. We turn, therefore, to consider the legal propriety of the June 11 Order.

C. Was *Frye* properly applied

¶ 19 By its own words, *Frye* applies to the use of novel scientific theories or processes to produce results. At the outset, we note that neither Plaintiff nor her lawyers argue that any scientific principle or process can be used to produce memories that are always or often accurate. As a matter of scientific principle, one may now say that E

[1 P.3d 119]

Page 476

always equals MC2, but Plaintiff does not claim that some scientific process, theory, or formula may be applied to test whether her memories of having been molested are true and accurate or whether the memories were imagined, suggested, implanted, or even, to put it tactfully, invented. One may or may not believe Plaintiff. The effect of the June 11 Order is to practically ensure Plaintiff's testimony will not be believed because she will not be allowed to present expert evidence to describe or

support the possible existence or diagnosis of repressed memory or dissociative amnesia.

¶ 20 We believe, however, that the truth of Plaintiff's testimony that she actually and accurately recalled or remembered the events, as distinguished from inventing them or having had them suggested or implanted, is for a jury to decide. While Defendant contends the alleged loss of memory and consequent delay in reporting make Plaintiff's testimony unworthy of belief, in this, as in other cases, Rule 702 allows Plaintiff to call expert witnesses to explain her behavior following the events alleged and to help the jury determine whether Plaintiff's memories are real and accurate or imagined. We have so held on just such issues in the criminal law.

¶ 21 In *State v. Lindsey*, for example, we dealt with the question of expert testimony regarding "behavior patterns of victims of 'in-home incestuous-type [child] molesting.'" 149 Ariz. 472, 473, 720 P.2d 73, 74 (1986). The court of appeals noted that the evidence was offered to explain why child victims of incest may not reveal the events until long after the occurrence and why they may recant. *State v. Lindsey*, 149 Ariz. 493, 495-96, 720 P.2d 94, 96-97 (App.1985). The trial judge overruled defendant's *Frye* objection to the opinion evidence. *Lindsey*, 149 Ariz. at 476, 720 P.2d at 77. The Martone dissent makes much of the fact that the expert testimony was based on "recognized principles of social and behavioral science." But Doctor van der Kolk's testimony is similarly based on principles of social and behavioral science recognized by clinicians. There was no *Frye* hearing in *Lindsey*. Defendant's *Frye* objection was overruled because the judge "determined Doctor Baker was qualified to testify because she had practiced" in the field, "saw patients" suffering from child sexual abuse, consulted with state agencies and case workers, and made "decisions and plans on specific cases [as well as doing] psychological evaluation of child victims and [having] seen over 100 victims, mostly in the family-type situation." *Id.* at 497, 720 P.2d at 98. We had the following comment regarding the propriety of admitting such testimony:

The trial judge has discretion to allow such expert testimony [under Rule 702] where it may assist the jury in deciding a contested issue, including issues pertaining to accuracy or credibility of a witness' recollection or testimony. The trial judge may exercise this discretion where there is a reasonable basis to believe that the jury will benefit from the assistance of expert testimony that explains recognized principles of social or behavioral science which the jury may apply to determine issues in the case. Testimony of this type is not to be permitted in every case, but only in those where the facts needed to make the ultimate judgment may not be within the common knowledge of the ordinary juror.

[T]he court of appeals correctly concluded that the trial court did not abuse its discretion in permitting ...

testimony on general patterns of behavior. We cannot assume that the average juror is familiar with the behavioral characteristics of victims of child molesting. Knowledge of such characteristics may well aid the jury in weighing the testimony of the alleged child victim. Children who have been the victims of sexual abuse or molestation may exhibit behavioral patterns (e.g. recantation, conflicting versions of events, confusion or inarticulate descriptions) which jurors might attribute to inaccuracy or prevarication, but which may be merely the result of immaturity, psychological stress, societal pressures or similar factors as well as of their interaction.

Id. at 473-74, 720 P.2d at 74-75 (citations omitted); *see also State v. Moran*, 151 Ariz. 378, 728 P.2d 248 (1986).

¶ 22 In *State v. Roscoe*, we again dealt with behavioral evidence, though of a much different

[1 P.3d 120]

Page 477

sort. We held a dog handler's opinion on the alleged ability of his tracking dog to identify scent long after it was laid down was admissible and *Frye* inapplicable. 145 Ariz. 212, 219-20, 700 P.2d 1312, 1319-20 (1984). We explained:

The evidence here was not bottomed on any scientific theory. In fact, it appears that no one knows exactly how or why some dogs are able to track or scent, or the degree to which they are able to do so. No attempt was made to impress the jury with the infallibility of some general scientific technique or theory. Rather, this evidence was offered on the basis that it is common knowledge that some dogs, when properly trained and handled, can discriminate between human odors. Preston's testimony was premised upon this simple idea and was not offered as a product of the application of some accepted scientific process, principle, technique or device. It was offered as *Preston's opinion* of the meaning of his dog's reaction; that opinion was based upon *Preston's* training of and experience with the dog. The weight of the evidence did not hinge upon the validity or accuracy of some scientific principle; rather, it hinged on *Preston's* credibility, the accuracy of his past observation of the dog's performance, the extent of the training he had given the dog, and the reliability of his interpretations of the dog's reactions. It was not the theories of Newton, Einstein or Freud which gave the evidence weight; if so, the *Frye* test should have been applied. It was, rather, *Preston's* knowledge, experience and integrity which would give the evidence weight and it was *Preston* who was available for cross-examination. His credentials, his experience, his motives and his integrity were effectively probed and tested. Determination of these issues does not depend on science; it is the exclusive province of the jury.

Id. (citations omitted); *see also Brooks v. Colorado*, 975 P.2d 1105 (Colo.1999) (similar experience-based

testimony subject to Rule 702 analysis, not *Frye*); *Louisiana v. Catanese*, 368 So.2d 975 (La.1979) (excluding polygraph evidence using equivalent of Ariz.R.Evid. 702). It turned out that the witness presenting the dog-scent evidence in *Roscoe* was a charlatan. *See State v. Roscoe*, 184 Ariz. 484, 910 P.2d 635 (1996) (*Roscoe II*). But neither Rule 702 (with or without *Frye*), *Daubert/Kumho*, nor any other system can guarantee the validity of any particular evidentiary ruling. Just as the refusal to apply *Frye* to *Preston's* dog-scent evidence led to the admission of false testimony, so the application of *Frye* or *Daubert* could well have led to the exclusion of testimony from Einstein or Freud, both of whom advanced theories not generally accepted for many years. *See* CLIFFORD M. WILL, WAS EINSTEIN RIGHT? (1986).

¶ 23 In *State v. Hummert*, we held that expert opinion on probability percentages based on computations derived from DNA statistics was inadmissible under *Frye* because the statistical bases and resultant formulae applied to reach the conclusion were not yet generally accepted. The expert's opinion--the final result--was based on a process or formula established by others and not generally acknowledged by scientists and statisticians in that field. 188 Ariz. 119, 124-25, 933 P.2d 1187, 1192-93 (1997). But we also held that the expert could relate his experience in the field to the facts and that an opinion based on his observations and experience would be admissible. *Id.* at 125, 933 P.2d at 1193. This was not, as the Martone dissent claims, because the DNA principle passed the *Frye* test. *See* Martone dissent at ¶ 83. It was, rather, because the opinions offered on random match frequency, while not generally accepted, passed the Ariz.R.Evid. 702 test of witness observation and experience. We explained:

The experts' testimony in the present case involved two types of evidence--scientific evidence on the procedures for determining a match between evidentiary DNA and opinion evidence concerning the experts' experience with random matches. The trial judge properly applied the *Frye* analysis and determined that evidence of a match is admissible. However, on the basis of the scientific evidence then available, the judge did not allow the experts to testify about the mathematical or statistical probability resulting from the match. Instead, the experts were allowed to offer evidence of

[1 P.3d 121]

their personal opinion. This testimony is governed not by the application of *Frye* but by Arizona Rules of Evidence 702 and 703. "*Frye*-ing" scientific evidence is necessary when application of a scientific technique is "likely to have an enormous effect in resolving completely a matter in controversy." However, when the expert gives testimony that "only helps a trier to interpret the evidence ... it will be received on a lesser showing of scientific certainty." As we stated in *Roscoe*, "[t]he weight of the

evidence did not hinge upon the validity or accuracy of some scientific principle; rather, it hinged on [the expert's] credibility, the accuracy of his past observation ... the extent of the training ... and the reliability of his interpretations...." The experts in this case did not testify to conclusions based on the application of Cellmark's statistics and database but only to their own experience. Having made the DNA examination according to recognized scientific principles and finding a match at three loci, the experts claimed that because of the unique nature of each person's DNA, they had never before seen a three-loci match from unrelated individuals. On the basis of their own experience, they believed such a random match would be very uncommon. The trial judge did not err in admitting this evidence of the experts' own work and experience and the opinions reached on that basis. See *Ariz.R.Evid.* 702 and 703.

Id. at 124-25, 933 P.2d at 1192-93 (citations omitted).

¶ 24 Many cases in our courts, and in those of other states with rules similar to our *Ariz.R.Evid.* 702, reach similar conclusions in dealing with expert opinion in matters of behavioral science. Our court of appeals concluded that *Frye* was inapplicable to expert testimony on child sexual abuse accommodation syndrome (CSAAS). *State v. Varela*, 178 Ariz. 319, 873 P.2d 657 (App.1993). The court remarked that "testimony concerning general characteristics of child sexual abuse victims is not 'new, novel or experimental scientific evidence' and therefore does not require the additional screening provided by *Frye*." *Id.* at 325-26, 873 P.2d at 663-64 (quoting *People v. Stoll*, 49 Cal.3d 1136, 265 Cal.Rptr. 111, 783 P.2d 698, 714 (1989)); see also *State v. Tucker*, 165 Ariz. 340, 346, 798 P.2d 1349, 1355 (App.1990) (behavioral characteristics of child molesters and victims); *State v. Stowers*, 81 Ohio St.3d 260, 690 N.E.2d 881 (1998) (*Frye* inapplicable to expert's testimony that alleged child victim's behavior, including delayed disclosure and recantation, is consistent with behavior expert observed in victims of CSAAS).

¶ 25 Of course in *Varela* and *Tucker*, as in the other cases cited, the testimony was not offered as direct proof that sexual abuse occurred but as an explanation of behavior that would help the jury understand the evidence and determine whether the charge was true. See also *Frenzel v. Wyoming*, 849 P.2d 741 (Wyo.1993) (although CSAAS is not yet generally accepted and thus not admissible to prove sexual abuse actually occurred, expert testimony based on experience, observation, and literature may be admitted to explain behavior of alleged victim, including delayed reporting); cf. *Lantrip v. Kentucky*, 713 S.W.2d 816 (Ky.1986) (an example of cases holding CSAAS not generally accepted, therefore testimony inadmissible); see also *Sely v. Capuchin Province*, 877 F.Supp. 1055 (E.D.Mich.1995) (evidence such as Dr. van der Kolk's admissible, but expert may not testify about victim's credibility).

¶ 26 We have reached similar conclusions in rape cases. In upholding a rape conviction based in part on psychiatric testimony regarding the way in which post-traumatic stress syndrome might have affected the victim's behavior, we noted that courts in other states disagreed on the admissibility of so-called rape trauma syndrome to prove the rape occurred but nevertheless concluded:

Although we might have some difficulty in upholding the admissibility of rape trauma syndrome to prove the existence of a rape, we believe, however, if properly presented by a person qualified by training and experience such as a psychiatrist or psychologist, that such evidence is admissible to show lack of consent. This testimony would not invade the province of the jury. The expert would be subject to cross-examination and the jury could then determine

[1 P.3d 122]

what weight the evidence is to receive.

State v. Huey, 145 Ariz. 59, 63, 699 P.2d 1290, 1294 (1985).

¶ 27 Other states have reached similar conclusions with regard to rape trauma syndrome. The California Supreme Court, for example, applied *Frye* and concluded that expert testimony was not admissible to prove that rape occurred. If factually relevant, however, it would have been admissible to explain behavior following the incident and to rebut popular misconceptions that might have given credence to a defendant's argument that the victim's delayed reporting or other behavior would justify an inference that rape had not occurred. *California v. Bledsoe*, 36 Cal.3d 236, 203 Cal.Rptr. 450, 681 P.2d 291, 298-99 (1984); see also *Colorado v. Hampton*, 746 P.2d 947, 949-52 (Colo.1987) (collecting cases and holding that *Frye* test inapplicable when behavioral testimony offered to explain ninety-day reporting delay).

¶ 28 These principles are not limited to criminal cases. The same rationale is applied in cases involving medical causation and techniques. *Gilkey v. Schweitzer*, 295 Mont. 345, 983 P.2d 869 (1999) (evidentiary standards applicable to novel scientific evidence should not have been applied to preclude anesthesiologist's expert opinion that placement of catheter while patient was anesthetized increased risk of injury). In a recent case in which the operative facts are quite similar to those in this case, the court was required to decide whether a physician's testimony based on experience, observation, and study of literature was admissible on the question of whether stress could trigger otherwise asymptomatic multiple sclerosis. *Colwell v. Mentzer Inv., Inc.*, 973 P.2d 631 (Colo.App.1998). Refusing to apply *Frye* and using a version of Rule 702 identical to Arizona's, the court blended a number of theories but held the testimony should be admitted. The admissibility of such testimony

should be determined by balancing

(1) the reliability of the scientific principles upon which the testimony rests, i.e., the potential to aid the jury in reaching an accurate resolution of a disputed issue, and (2) the likelihood that the introduction of the evidence may overwhelm or mislead the jury.

* * *

The reliability inquiry does not require a process of scientific "nose-counting." Rather, a court should consider factors such as the degree of acceptance in the scientific community, the novelty of the scientific principle, and the existence of specialized literature on the subject.

* * *

The expert's qualifications and expertise in the area of MS were not disputed, and the trial court determined that his testimony would be helpful to the trier of fact. His testimony did not involve the application of any novel or newly developed scientific device or process, nor did it involve the manipulation of physical evidence. Rather, it concerned his observations of thousands of cases of MS and review of studies by others.

Plaintiff's expert, a board certified neurologist, testified that he has been in practice for over 40 years. At the time of the trial he taught at Harvard Medical School and ran the multiple sclerosis project at the Beth Israel Hospital in Boston, Massachusetts. He testified that over the course of his career he had seen between 5,000 and 6,000 MS patients. In his opinion, certain kinds of stress in some patients with MS can trigger the appearance of symptoms in an asymptomatic patient....

The evidence presented at trial concerned the effect that stress could have in causing MS to become symptomatic. Such testimony would assist the trier of fact in understanding the evidence of what researchers in the field have discovered. Thus, the evidence satisfies the threshold inquiry.

Id. at 636-37 (citations omitted).

¶ 29 Finally, a recent California case directly on point puts the matter quite well. The plaintiffs claimed their memory of sexual abuse by their father and stepfather had been repressed and then fortuitously triggered. They offered expert evidence by a

[1 P.3d 123]

Page 480

psychologist who specialized in the field of sexual abuse and memory. The California court refused to apply either *Frye* or *Daubert* and affirmed the trial judge's refusal to hold a *Frye* hearing, holding the judge correctly admitted

the expert's opinion that the circumstances and plaintiffs' behavior were "consistent with other individuals who had repressed their memories of childhood sexual abuse." *Wilson v. Phillips*, 73 Cal.App.4th 250, 86 Cal.Rptr.2d 204, 206 (1999). The court explained:

California distinguishes between expert medical opinion and scientific evidence; the former is not subject to the special admissibility rule of *Kelly-Frye*. *Kelly-Frye* applies to cases involving novel devices or processes, not to expert medical testimony, such as a psychiatrist's prediction of future dangerousness or a diagnosis of mental illness.

Similarly, the testimony of a psychologist who assesses whether a criminal defendant displays signs of deviance or abnormality is not *subject* to *Kelly-Frye*.

Id. at 207 (quoting *California v. Ward*, 71 Cal.App.4th 368, 83 Cal.Rptr.2d 828, 833 (1999) (*Frye* inapplicable to psychologist's opinion of defendant's propensity to repeat sexually violent behavior)). The Martone dissent labels *Wilson* a "renegade" case. Martone dissent at ¶ 81. In fact, it is simply the latest in a long line of California cases refusing to apply *Frye* to testimony like that offered from Doctor van der Kolk. *See Wilson*, 86 Cal.Rptr.2d at 206-08 (citing cases).

¶ 30 There are many more cases, with varying rationales and conclusions, but we extract and apply the same rule that our courts have previously applied in cases involving Ariz.R.Evid. 702. *See, e.g., Huey*, 145 Ariz. 59, 699 P.2d 1290; *Lindsey*, 149 Ariz. 472, 720 P.2d 73; and *Moran*, 151 Ariz. 378, 728 P.2d 248. Opinion testimony on human behavior is admissible when relevant to an issue in the case, when such testimony will aid in understanding evidence outside the experience or knowledge of the average juror, and when the witness is qualified, as Ariz.R.Evid. 702 requires, by "knowledge, skill, experience, training, or education." To put it simply, *Frye* is inapplicable when a qualified witness offers relevant testimony or conclusions based on experience and observation about human behavior for the purpose of explaining that behavior. Of course, our cases forbid a witness from expressing an opinion on the alleged victim's credibility or the truth of allegations of sexual abuse or rape. This principle applies as well in the present case to Doctor van der Kolk's proposed testimony. Expert testimony is admitted to explain behavior that a party claims is consistent or inconsistent with the alleged event. As we said in *Hummert*:

Although compliance with *Frye* is necessary when the scientist reaches a conclusion by applying a scientific theory or process based on the work or discovery of others, under Rules 702 and 703 experts may testify concerning their own experimentation and observation and opinions based on their own work without first showing general acceptance. Such evidence need only meet the traditional requirements of relevance and avoid

substantial prejudice, confusion, or waste of time.

188 Ariz. at 127, 933 P.2d at 1195; see also *California v. McDonald*, 37 Cal.3d 351, 208 Cal.Rptr. 236, 690 P.2d 709 (1984).

¶ 31 This does *not* mean, as the dissenters argue, that we believe the practice of medicine, including psychiatry, is not based on science. See Martone dissent at pp 79, 87-88; McGregor dissent at ¶ 102. Rather, it means that expert evidence based on a qualified witness' own experience, observation, and study is treated differently from opinion evidence based on novel scientific principles advanced by others. As in the past, *Frye* continues to apply only to the latter. The June 11 Order applied *Frye* to prohibit observation- and experience-based expert testimony about recovered memory, no matter for what purpose offered. Insofar as it relied on *Frye*, the order was therefore overbroad and legally erroneous and must be vacated. See *State v. Chapple*, 135 Ariz. 281, 297 n. 18, 660 P.2d 1208, 1224 n. 18 (1983). Because the evidence in question is not precluded by the *Frye* test, its admissibility is to be determined under Ariz.R.Evid. 702.

¶ 32 The Martone dissent misstates and exaggerates our holding by prophesying that

[1 P.3d 124]

Page 481

our refusal to apply *Frye* to Doctor van der Kolk's testimony means that "any expert" on human behavior can hereafter be allowed to testify to any theory, "however farfetched," without any showing of scientific reliability. Martone dissent at pp 80-81. Doctor van der Kolk is not any expert testifying to farfetched theories. As one glance at his curriculum vitae shows, he is a very experienced, well recognized, respected clinician with degrees in psychology and medicine. See Appendix A. He is asked to testify to his experience and observation in caring for patients, such as Plaintiff, who report repressed memory of sexual abuse. We hold simply that he can be asked to testify to his opinions based on the results of his experience, his observations, his own research and that of others with which he is familiar, and the care of his patients. It is true that some or many research psychologists, including Defendant's witness, disagree, mainly because repressed memory is "woefully short" of empirical verification. See 1 DAVID L. FAIGMAN, DAVID H. KAYE, MICHAEL J. SAKS, & JOSEPH SANDERS, MODERN SCIENTIFIC EVIDENCE: THE LAW AND SCIENCE OF EXPERT TESTIMONY § 13-1.5, at 534 (1997). But as the succeeding paragraph of the cited treatise points out, we must "also balance justice, fairness, efficiency, and other factors related to [the law's] special role in American society." *Id.* at 535. In doing so, we must decide whether the judge or the jury should resolve the controversy between clinical

psychiatrists and psychologists on the one hand and research psychologists on the other. This, of course, brings us back again to the application of Rule 702 and *Daubert* as interpreted by the cases that follow it.

D. Rule 702 and *Daubert*

¶ 33 One method of interpreting Rule 702 of the Federal Rules of Evidence is that adopted by the United States Supreme Court in *Daubert*. It was unclear at first whether *Daubert* applied only to the methodology used to reach scientific opinions or whether it applied to all opinion evidence offered under Rule 702. The Court subsequently held that a district judge's reliability determination applied to both conclusions and methodology and was reviewable only on an abuse of discretion standard. *General Electric Co. v. Joiner*, 522 U.S. 136, 141, 118 S.Ct. 512, 517, 139 L.Ed.2d 508 (1997). Then in *Kumho Tire Co., Ltd. v. Carmichael*, the Court applied *Daubert*'s gatekeeper concept to the testimony of a tire failure expert, explaining that the *Daubert* rule was applicable to all opinion evidence offered under Fed.R.Evid. 702. 526 U.S. 137, 147-51, 119 S.Ct. 1167, 1174-75, 143 L.Ed.2d 238 (1999).

¶ 34 One treatise has summarized the effect of these three cases in the following words:

The *Kumho* Court explained that the language of Rule 702 makes no relevant distinction between "scientific" knowledge and "technical" or "other specialized knowledge." Moreover, such a distinction would be hard to draw, since there is no clear line that divides scientific from other types of expert knowledge.

Proposed amendments to Rule 702 also address the applicability of the *Daubert* principles. The Advisory Committee Note to the proposed amended rule states that expert testimony of all types presents questions of admissibility for the trial court in deciding whether the evidence is reliable and helpful. The proposed amendment would provide that all expert testimony must be based on reliable facts or data and be the product of reliable principles and methods, and requires the witness to have applied the principles and methods reliably to the facts of the case.

JACK B. WEINSTEIN & MARGARET A. BERGER, 4 WEINSTEIN'S FEDERAL EVIDENCE § 702.05[2] [b] (Joseph M. McLaughlin, ed., 2d ed.1997) (footnotes omitted).

The reliability requirement is designed to exclude so-called "junk science"—conjuring up memories of the phrenology craze where the bumps on a person's head were felt in order to determine character traits—from federal courts. At the very least, scientific opinions offered under Rule 702 must be based on sound scientific methods and valid procedures.

The primary focus must be on the principles and

methods used, not on the conclusions generated. But conclusions and methodology are "not entirely distinct

[1 P.3d 125]

from one another." District courts are not required to admit "opinion evidence which is connected to existing data only by the *ipse dixit* of the expert. A court may conclude that there is simply too great an analytical gap between the data and the opinion proffered."

Id. § 702.05[3] (footnotes omitted). [4]

¶ 35 Both parties urge that this court adopt the *Daubert* interpretation of Ariz.R.Evid. 702. Plaintiff urges that the record as it stands is sufficient to require admission of Doctor van der Kolk's testimony, while Defendant argues that the present record permits us to affirm the trial judge's preclusion ruling under *Daubert* or at least to remand so that the trial judge can reconsider his ruling under *Daubert* and its progeny.

¶ 36 In *Daubert*, the Court noted that *Frye* preceded adoption of the Rules of Evidence and concluded that those rules had been designed to liberalize the use and admission of opinion evidence. 509 U.S. at 587, 113 S.Ct. at 2794. The result reached in *Kumho*, however, would seem directly opposed to the principle of liberalized admissibility that engendered the abolition of *Frye*. Michael N. Graham, *The Daubert Dilemma--At Last A Viable Solution*, 179 F.R.D. 1, 6 (1998) (criticizing *Daubert* and urging states to adhere to *Frye*).

¶ 37 Arizona adopted *Frye* in 1962. See *State v. Valdez*, 91 Ariz. 274, 371 P.2d 894 (1962) (precluding polygraph evidence for its failure to gain general acceptance). We adopted our version of the Rules of Evidence in 1977. Many courts and commentators believed that *Frye* "could be read into the regulation of expert testimony in Rule 702." 22 CHARLES ALAN WRIGHT & KENNETH W. GRAHAM, *FEDERAL PRACTICE AND PROCEDURE* § 5168.1, at 85 (Supp.1998); see also MCCORMICK ON EVIDENCE § 203, at 731 (John W. Strong, ed., 5th ed.1999). Unlike the United States Supreme Court, however, we have left no doubt whether Ariz.R.Evid. 702 was intended to abolish the *Frye* doctrine, for we have continued to apply *Frye* since the adoption of Rule 702 and have faced these same questions before.

¶ 38 In *State v. Bible*, we were asked to abandon *Frye*, adopt *Daubert*, and admit DNA statistical probability evidence. We held the statistical evidence inadmissible under *Frye*, pointing out that *Daubert* was a departure from Ariz.R.Evid. 702, that the "nature of [its] requirement is currently unknown, may vary from case to case and is to be fashioned by trial judges using an analytical framework as yet unspecified, ... leav[ing] many questions unanswered." 175 Ariz. 549, 580, 858 P.2d 1152, 1183 (1993). Recognizing the shortcomings in the *Frye* rule, we nevertheless decided to postpone

deciding whether to adopt *Daubert*. *Id.* Presented with the same question in a later case, we came to the same conclusion: the "federal courts have not yet had a fair opportunity to apply *Daubert*; thus it is too early to properly evaluate it." *State v. Johnson*, 186 Ariz. 329, 331, 922 P.2d 294, 296 (1996). But *Joiner* and *Kumho* now flesh out *Daubert*'s bare bones, the parties in the present case have argued the issue, and we must therefore address it to give our trial courts direction on the issues before them.

¶ 39 *Daubert* and its progeny have not been received with unanimous approbation. The dissenters speak of *Daubert* as if it worked only a small change, if any, in the law for it only requires the trial judge to perform the ordinary "legal task of determining both the relevance and the reliability of scientific foundation." Martone dissent at ¶ 91; McGregor dissent at ¶ 103. But *Daubert*'s "shift in perspective is subtle yet profound. Whereas *Frye* required judges to survey the pertinent field to assess the validity of the proffered scientific evidence, *Daubert* calls upon judges to assess the merits of the scientific research supporting an expert's opinion." 1 FAIGMAN, ET AL., *supra*, at viii. Thus, leading commentators and authorities in the field of evidence have criticized it. See, e.g., 29 CHARLES ALAN WRIGHT & VICTOR J. GOLD, *FEDERAL PRACTICE AND PROCEDURE* § 6266, at 266 n. 15 (Supp.1998) ("Any relevant conclusions

[1 P.3d 126]

Page 483

supported by a qualified expert witness should be received unless there are distinct reasons for exclusion. These are the familiar ones" already contained in the rules.) (citations omitted). Professor Wright's criticism is thought-provoking:

Additionally, the *Daubert* opinion offers no convincing rationale for a special test for the admissibility of expert scientific testimony. Many writers have thought that it was enough to abolish *Frye* and leave the supposed problems of "junk science" to the normal rules of relevance. *While the Court's opinion does suggest that the adversary system is better than exclusion as a method of dealing with neo-phrenologists, the opinion also suggests that motions for summary judgment or directed verdicts maybe employed by judges who don't trust jurors to treat anti-corporate science with the appropriate disdain. Since those remedies are only effective against those who bear the burden of proof, this suggests that the Court supposes that the persons most deserving of special protection from spurious expertise are corporations and other wealthy defendants--the very parties most capable of manufacturing or purchasing questionable scientific opinions.*

Finally, the *Daubert* opinion appears politically naive about the "methods and procedures" of both science

and evidentiary admissibility. As to the first, students of science have commented on the fact that peer review and other techniques of scientific validation suffer from a lack of political sophistication. This is a serious flaw in relying on those methods to determine evidentiary admissibility because this politicized science is prevalent in litigation. The Daubert case is itself a good example. Whether or not Benedictin is capable of causing cancer may be a scientific question but it is one of a different order from whether birds are descended from dinosaurs or the Big Bang theory is "true." Broad questions, such as whether AIDS is caused by the HIV virus, are likely to benefit from the scientific "adversary system"; narrower questions, such as the efficacy of the Dalkon shield, are of less general interest and thus escape more rigorous scientific scrutiny.

Similarly, the Daubert opinion seems naive about the politics of procedure. Multi-factored, "flexible" tests of the sort announced in Daubert are more likely to produce arbitrary results than they are to produce nuanced treatment of complex questions of admissibility. All the Court would have had to do to appreciate this was to look at the history of Evidence Rule 403. *Similarly, the Court's suggestion that questions of the validity of scientific evidence be handled by motions for summary judgment or directed verdicts may be read as an invitation to kill off disfavored causes of action in comparative secrecy rather than assassinate them by evidentiary rulings in open court.*

22 WRIGHT & GRAHAM, *supra* § 5168.1, at 86-87 (emphasis added).

¶ 40 While Professor Wright's supplement was written before *Kumho*, that case significantly heightens the problems. In *Kumho*, the Court held the district judge properly acted as a reliability gatekeeper in finding insufficient indications of the reliability of the methodology used by a tire failure expert. The judge has broad discretion, the Court said, to determine and apply standards of reliability on a case-by-case basis. 526 U.S. at 149-53, 119 S.Ct. at 1175-76. With all due respect, the argument that follows and affirms the trial judge's unreliability finding reads more like a jury argument than an application of legal principle. *Id.* at 151-59, 119 S.Ct. at 1176-79.

¶ 41 It is impossible, indeed, to reconcile *Kumho* with the Court's earlier decision in *Barefoot v. Estelle*, a capital case in which the prosecution presented psychiatric opinion evidence predicting the possibility of the defendant's future dangerousness if not sentenced to death. 463 U.S. 880, 103 S.Ct. 3383, 77 L.Ed.2d 1090 (1983). Rejecting the position of the amicus, the American Psychiatric Association, that psychiatrists "are incompetent to predict [such future behavior] with any acceptable degree of reliability," the Court said:

evidence generally extant at the federal and state levels anticipate that relevant, unprivileged evidence should be admitted and its weight left to the factfinder, who would have the benefit of cross-examination and contrary evidence by the opposing party. Psychiatric testimony predicting dangerousness may be countered not only as erroneous in a particular case but also as generally so unreliable that it should be ignored. If the jury may make up its mind about future dangerousness unaided by psychiatric testimony, jurors should not be barred from hearing the views of the State's psychiatrists along with opposing views of the defendant's doctors.

Id. at 898, 103 S.Ct. at 3397. The Court was confident "that the factfinder and the adversary system" would be "competent to uncover, recognize and take due account of [the] shortcomings" of possibly unreliable expert opinion. *Id.* at 899, 103 S.Ct. at 3398.

¶ 42 *Daubert* does not mention *Barefoot*. Perhaps the Court intends to interpret Fed.R.Evid. 702 differently in criminal cases. [5] But as the earlier survey of our cases shows, in criminal prosecutions we have not subjected testimony seeking to explain human behavior to any preliminary gatekeeping test of reliability. We do not believe different tests should apply in civil cases; to the contrary, rules determining the competency of evidence should apply across the board, whether the case is on the civil or criminal calendar. We find it hard to believe that evidence deemed admissible in prosecutions resulting in imposition of death or long terms of imprisonment should be held unreliable and therefore inadmissible in tort cases based on the same type of act that leads to many criminal prosecutions.

¶ 43 Perhaps the Court had reason to see things differently in the ten years that elapsed between *Barefoot* and *Kumho*. Nothing in *Daubert* or *Kumho* indicates this, but perhaps history permits us to "identif[y]" the unarticulated reasons that [may] explain this erratic journey." Michael H. Gottesman, [6] *From Barefoot to Daubert to Joiner: Triple Play or Double Error?*, 40 ARIZ.L.REV. 753, 753 (1998). Professor Gottesman's article traces the unhappiness of some federal appellate judges with what they perceived as the "phenomenon of venal experts saying anything the parties paying their fees wanted." *Id.* at 756, 119 S.Ct. 1167. He mentions also Judge Posner's comments, in a similar vein, in *Chaulk by Murphy v. Volkswagen of America, Inc.*, 808 F.2d 639, 644 (7th Cir. 1986) (Posner, J., dissenting), and Peter Huber's book, *GALILEO'S REVENGE: JUNK SCIENCE IN THE COURTROOM* (1991), [7] both advocating a judicial reliability screen. Then, in 1991 there was an effort by the Civil Rules Advisory Committee to change the Federal Rules of Evidence to incorporate such a screen. Gottesman, *supra*, 40 ARIZ.L.REV. at 757. The proposal was first withdrawn, then resubmitted with the backing of the Bush administration and Solicitor General Starr, who acknowledged that the Federal Rules of Evidence were

not intended to and did not provide for such a screen. See Dan Quayle, *Agenda for Civil Justice Reform in America*, 60 U.CINN.L.REV. 979, 999 (1992); see also Paul C. Giannelli, *Daubert: Interpreting the Federal Rules of Evidence*, 15 CARDOZO L.REV.1999, 2017 (1994).

¶ 44 One problem with this agenda for reform was that the Federal Rules of Evidence were enacted by Congress. Act of January 2, 1975, Pub. Law 93-595, 88 Stat.1926; Giannelli, *supra*, 15 CARDOZO L.REV. at

[1 P.3d 128]

Page 485

2003. See a description of the general rulemaking process in *Beech Aircraft Corp. v. Rainey*, 488 U.S. 153, 163-65, 109 S.Ct. 439, 447-48, 102 L.Ed.2d 445 (1988), which also comments on the rules' "general approach" of "relaxing the traditional barriers to opinion testimony." *Id.* at 169, 109 S.Ct. at 450. Thus, any modification of Fed.R.Evid. 702 and 703 could be accomplished only through congressional action on whatever recommendation might come from the rules committee. Gottesman, *supra*, 40 ARIZ.L.REV. at 757. It was at this stage that the Supreme Court mooted the issue in 1993 with *Daubert*'s holding that the existing rule incorporated a reliability screen, authorizing the trial judge to determine reliability (and eventually, in *Kumho*, essential credibility) of a qualified expert's testimony as a prerequisite for the jury's determination of the same issues.

¶ 45 In erecting this hurdle for opinion evidence, the Court found a reliability standard inherent in the 1972 formulation of Fed.R.Evid. 702, although neither the federal rules committee nor the congressional judiciary committees even discussed such a standard or the *Frye* issue. Giannelli, *supra*, 15 CARDOZO L.REV. at 2000-01. Nor had such a standard been considered in prior efforts at evidentiary codification, such as the Uniform Rules of Evidence and the Model Code of Evidence. *Id.* at 2017. The issue of scientific reliability as a prerequisite for admission of scientific evidence actually arose in the 1991 recommendations of the Civil Rules Advisory Committee. *Id.*; Gottesman, *supra*, 40 ARIZ.L.REV. at 757.

¶ 46 Turning to our rules, nothing in the comments of this court or its committees indicated that a reliability standard was contemplated by our adoption of Ariz.R.Evid. 702. Given the rule's text and cases such as *Hummert*, 188 Ariz. 119, 933 P.2d 1187; *Johnson*, 186 Ariz. 329, 922 P.2d 294; and *Bible*, 175 Ariz. 549, 858 P.2d 1152—all decided after we adopted Ariz.R.Evid. 702—we could not now discover such a standard implicit in the language of the rule, phrased as it is in terms of "specialized knowledge" that will assist the jury "to understand the evidence or to determine" the facts and permitting expert testimony when a witness is "qualified

... by knowledge, skill, experience, training, or education." Nor do we believe we should interpret the rule to include such a standard.

¶ 47 There are a number of reasons for this. First, our experience with the *Frye* rule has not been bad. It is true, as the Supreme Court indicated in *Daubert* and the commentators note, Fed.R.Evid. 702 did not purport to adopt the *Frye* principle. *Daubert*, 509 U.S. at 588, 113 S.Ct. at 2794. See ¶ 37, *supra*. But the rules did contemplate "further common law development," which would not, of course, exclude the "vitality of the general acceptance standard" for certain types of testimony. MCCORMICK ON EVIDENCE § 203, at 731. Review of our cases leads us to conclude that our formulation of the *Frye* rule, limiting it, as we have in our case law, to a witness' opinion based on application of novel scientific principle or technique formulated by another, has been strict enough to enable our trial judges to reject the truly questionable [8] while enabling them to admit those principles and techniques based on generally accepted scientific theory. [9] And our trial and appellate judges

[1 P.3d 129]

Page 486

have been commendably able in making prompt and accurate *Frye* determinations in even the most difficult and arcane disciplines. [10] Thus, although we recognize that *Frye* is not perfect, we believe it is a necessary and generally helpful rule. *Bible*, 175 Ariz. at 578-80, 858 P.2d at 1181-83. We have not yet seen any reason to conclude that the rule, as limited and applied in our case law, needs liberalizing; nor, as explained in section C *supra*, do we believe its application should be broadened to apply to behavioral or experience-based testimony. To change the law in that manner would call into question a large number of criminal convictions or at least raise profound questions of why a rule good enough for criminal cases carrying draconian penalties is not good enough for what Justice Blackmun described in *Barefoot* as "routine lawsuits for money damages." See note 5, *supra*.

¶ 48 One of the arguments for adopting *Daubert* is to allow trial judges to put a halt to improper verdicts from jurors misled by junk science and experts ready at the drop of a hat (or a dollar) to say anything for any party. This, of course, is a two-edged sword—plaintiffs' lawyers do not have a monopoly on venal or inaccurate experts. [11] But we do not believe *Daubert*/*Kumho* will prove to be a perfect or even a good antidote. Implicit in *Joiner* and *Kumho* is the assumption that trial judges as a group will be more able than jurors to tell good science from junk, true scientists from charlatans, truthful experts from liars, and venal from objective experts. But most judges, like most jurors, have little or no technical training "and are not known for expertise in science," let alone in the precise discipline involved in a particular

case. 1 FAIGMAN, ET AL., *supra*, at vii.

¶ 49 Nor do our trial judges have time for *Kumho* hearings in each case in which expert testimony is to be offered. Those hearings require the equivalent of a *Frye* hearing, for general acceptance is one of the *Daubert* factors, and also require findings in a variety of other matters, changing from case to case. *Kumho*, 526 U.S. at 149-53, 119 S.Ct. at 1175-76. As Judge Kozinski noted, applying *Daubert* will be a "complex and daunting task." *Daubert v. Merrell Dow Pharmaceuticals*, 43 F.3d 1311, 1316 (9th Cir. 1995). The dissenters have an optimistic view of *Daubert* and *Kumho*, but that view is quite premature. See Martone dissent at ¶ 90-92; McGregor dissent at ¶ 104. The co-author of what the Martone dissent describes as the "preeminent treatise" on scientific evidence acknowledges that it will take at least the "next several years [to] determine whether *Daubert* was an enlightened step forward in the way the law uses science or a stumble backward into the darkness of a 'Kafkaesque nightmare.'" DAVID L. FAIGMAN, *LEGAL ALCHEMY* 61 (1999).

¶ 50 The present case, with its proliferation of paper, is the paradigm of the problem *Kumho* would present. Unlike *Frye*, *Kumho* applies to all cases involving expert testimony, not just those involving a specific novel scientific principle. Further, while a *Frye* order establishes general acceptance of a theory for all cases, under *Daubert/Kumho* each trial judge in any case involving disputed expert testimony would have to review the eight or nine *Daubert/Kumho* factors so far revealed to us in case-specific pretrial testimonial hearings to determine reliability of the expert's techniques, experience, observation, methodology, and conclusions--subjectively inquiring into and determining not only general acceptance but all the factors so far identified and any others that appellate courts may yet deem appropriate to save us from juries that have been led or misled down the garden path. See Joseph T. Walsh, *Keeping the Gate*, 83 JUDICATURE 140, 143 (1999). [12]

[1 P.3d 130] Of course, no one can quantify how many times juries have been fooled by junk science, though it undoubtedly has occurred, or how many times this has favored the prosecution or the defense, the plaintiff or the defendant. Nor can anyone say how much more or truer justice would have been or will be attained if judges get the first crack at the evidence, together with the hitherto unprecedented power to preclude the jury from hearing contested, relevant evidence from a qualified witness. [13]

¶ 51 But let us assume, as does Justice Martone, that given the power conferred by *Kumho*, our trial judges would do better than juries. See Martone dissent at pp 93-94. Even then we would not follow *Daubert* as interpreted in *Kumho*. Our constitution preserves the "right to have the jury pass upon questions of fact by

determining the credibility of witnesses and the weight of conflicting evidence." *Burton v. Valentine*, 60 Ariz. 518, 529, 141 P.2d 847, 851 (1943). The framers' intent does not contemplate giving judges the power to determine reliability and credibility of a qualified expert as a prerequisite to submission of the expert's conclusions to a jury for its determination of the weight to be given to the testimony.

One other feature of the constitution might fairly be described as a device to allow for direct popular control of governmental action--the right of trial by jury. Consistent with their overall philosophy, the Arizona framers not only provided that the right shall "remain inviolate" (Article II, section 23) but took further steps to guard against encroachments on the independence of juries. Judges were forbidden to charge juries with respect to "matters of fact" and were prohibited from commenting on the evidence (Article VI, section 27). In the case of lawsuits to recover damages for death or injury, defenses of assumption of risk and contributory negligence were "in all cases whatsoever [and] at all times, [to] be left to the jury" (Article XVIII, section 5).

JOHN D. LESHY, *THE ARIZONA STATE CONSTITUTION, A REFERENCE GUIDE* 12 (1993). It would be strange that a judge forbidden to comment on the reliability or credibility of testimony would be empowered to preclude the jury from hearing the testimony at all because the judge believes it to be unreliable or not worthy of belief. Reduction or obliteration of the jury function may be seen by some as the ultimate tort reform, but it is one prohibited by our organic law.

[1 P.3d 131] ¶

Page 488

52 We believe *Joiner* and *Kumho* approach that result. The judge is made the gatekeeper, empowered to make preliminary determinations of reliability and credibility of qualified witnesses and to exclude the testimony of such witnesses if the judge concludes there is not a "valid connection" between the testimony and the "pertinent inquiry." *Kumho*, 526 U.S. at 149, 119 S.Ct. at 1175. Judges, of course, have the responsibility to exclude irrelevant evidence, but the valid connection to which *Kumho* refers goes far beyond determining relevancy. It includes the judge's determination of the "testimony's factual basis, data, principles, methods, or their application" to ascertain "whether the testimony has 'a reliable basis in the knowledge and experience of [the relevant] discipline.'" *Id.* (quoting *Daubert*, 509 U.S. at 592, 113 S.Ct. at 2786). Questions about the accuracy and reliability of a witness' factual basis, data, and methods go to the weight and credibility of the witness' testimony and are questions of fact. The right to jury trial does not turn on the judge's preliminary assessment of testimonial reliability. It is the jury's function to

determine accuracy, weight, or credibility.

¶ 53 Arizona's constitutional right to a jury trial does not, of course, forbid the trial judge from ruling on admission of evidence. The judge may certainly do so, and when the testimony is based on a novel scientific principle that the witness has taken from others and applied to the case at hand, the judge may, as a matter of foundation, require a showing of general acceptance. The *Daubert/Joiner/Kumho* trilogy of cases, however, puts the judge in the position of passing on the weight or credibility of the expert's testimony, something we believe crosses the line between the legal task of ruling on the foundation and relevance of evidence and the jury's function of whom to believe and why, whose testimony to accept, and on what basis. *Kumho*'s rationale illustrates the point. For example:

[S]ome of *Daubert*'s questions can help to evaluate the reliability even of experience-based testimony. In certain cases, it will be appropriate for the trial judge to ask, for example, how often an engineering expert's experience-based methodology has produced erroneous results, or whether such a method is generally accepted in the relevant engineering community. Likewise, it will at times be useful to ask even of a witness whose expertise is based purely on experience, say, a perfume tester able to distinguish among 140 odors at a sniff, whether his preparation is of a kind that others in the field would recognize as acceptable.

526 U.S. at 151, 119 S.Ct. at 1176. Such undoubtedly pertinent questions are better left to counsel, and the authority to decide them constitutionally left to jurors. We have no doubt that jurors will be as able as judges, if not more so, to evaluate the testimony of the perfume sniffer who prepares by a method unacceptable to most testers. [14]

¶ 54 This opinion does not lessen the trial judge's authority to determine the admissibility of evidence. See Ariz.R.Evid. 104(a) and (b). Rule 702 conditions admission of opinion evidence in part on the judge's determination that the evidence will "assist the trier of fact to understand the evidence or to determine a fact in issue." This, of course, pertains to the nature of the subject on which the opinion is to be given rather than the credibility of the witness expressing the opinion. *Lindsey*, 149 Ariz. at 495, 720 P.2d at 96; see also Cynthia H. Cwik, *Guarding the Gate: Expert Witness Admissibility*, 25 LITIGATION 6 (1999). *Kumho* elevates the concept of assistance to impermissible heights by allowing the trial judge to reject opinion testimony based on his or her views about the reliability and accuracy of the data relied on, the credibility of the witness, or the weight that should be given that witness' testimony. Of course, the line is difficult to draw, but in this case the judge's ruling on admissibility crossed the line and intruded on the jury's function.

[1 P.3d 132]

Page 489

¶ 55 We do not lessen trial judges' authority. We do not reject *Kumho* on a constitutional basis but because the authority over the admission of evidence given to trial judges by *Kumho* is much different from the authority long recognized by the Federal Rules of Evidence and the common law of evidence. *Daubert* and *Kumho* give the judge authority to preclude evidence because the judge disagrees with the methodology used by the witness or believes the methodology is unreliable or the witness is less credible than the witness produced by the other side. *Kumho*, in other words, permits the judge to engage in the weighing factor. Neither the common law of evidence nor the Federal Rules of Evidence permitted this type of judicial activism. The trial judge had authority to exclude evidence when it violated some rule of law, such as the best evidence rule or the hearsay rule. See Richard O. Lempert, *The Jury and Scientific Evidence*, IX KAN. J.L. & PUB. POL'Y 22 (1999). The trial judge was empowered to weigh and make judgments whether otherwise admissible evidence was to be excluded because its prejudicial value outweighed its probative value. But until *Kumho*, nothing in the rules or the common law permitted the judge to exclude evidence based on his or her conclusions as to the credibility of a qualified witness' conclusions.

¶ 56 We thus conclude that we should not and cannot adopt the *Joiner* and *Kumho* interpretation of *Daubert* but will continue to apply Ariz.R.Evid. 702 as written. Our conclusion is not, as the Martone dissent suggests, based on a lack of confidence in or appreciation for trial judges but instead an appreciation for the different functions of the trial judge and the jury. Justice McGregor's dissent points out that there are only seventeen states that have not adopted *Daubert* and expresses concern that we are overreacting to *Kumho* so that today's decision will possibly isolate Arizona from the "mainstream of judicial analysis." McGregor dissent at ¶ 99. These are matters of concern, but we believe we adopt the better rule and that in the long run the dangers of *Kumho* will be perceived and the mainstream of judicial decision will either shift or *Kumho*'s reach will be confined and *Daubert* applied as it should be—to questions of novel scientific evidence.

¶ 57 Our holding does not open the doors of our courthouses to false science and charlatans. The *Frye* rule remains as a barrier to offers of novel scientific and possibly pseudoscientific theory. The Rules of Evidence, and Rule 702 itself, erect barriers to admission of all opinion evidence: the evidence must be relevant, the witness must be qualified, and the evidence must be the kind that will assist the jury. See *Washington v. Greene*, 139 Wash.2d 64, 984 P.2d 1024, 1028-30 (1999) (even though *Frye* was satisfied and witness qualified, testimony on multiple personality-dissociative identity

disorder properly excluded in criminal prosecution because diagnosis was incapable of forensic application to Washington's definitions of legal insanity or diminished capacity; evidence therefore would not have assisted jury in performing its function); *see also Oregon v. Brown*, 297 Or. 404, 687 P.2d 751 (1984) (abandoning *Frye* rule, Oregon Supreme Court holds expert opinion evidence admissible under traditional standards of relevancy, and factors identified in Rule 702—qualified witness and testimony assisting jury; latter factors satisfied if testimony is within witness' field, witness is qualified, and opinion foundation intelligibly relates testimony to facts; even so, exclusion still possible under Rule 403).

¶ 58 As *Brown* points out, the rules also permit trial judges to reject even relevant evidence that meets the Rule 702 test if the probative value is "substantially outweighed by the danger of unfair prejudice, confusion ... or misleading the jury, or by considerations of undue delay, waste of time...." Ariz.R.Evid. 403. One could thus hypothesize that trial judges would not exceed their authority in excluding evidence based on theories of the Flat Earth Society, the Aristotelian concept of cosmology, astrology, or other false or pseudoscience. But our system provides even better tools to save us from junk scientists and charlatans. As the Supreme Court itself acknowledged, "vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate

[1 P.3d 133]

Page 490

means of attacking shaky but admissible evidence." *Daubert*, 509 U.S. at 596, 113 S.Ct. at 2798. For those who truly believe in the jury system, this, although imperfect, should be enough.

¶ 59 Thus, we address the problems inherent in false opinion evidence without permitting trial judges to encroach on the province and independence of the jury under the guise of acting as gatekeepers. We have armed trial judges with the ability to take the case from the jury even when there is a bare scintilla of evidence to support the claim. *Orme School v. Reeves*, 166 Ariz. 301, 802 P.2d 1000 (1990). But it is one thing to permit trial judges to grant summary judgment or direct a verdict when there is no more than a scintilla of evidence supporting a claim and a wholly different thing to give them the power to reduce the evidence to a scintilla by excluding otherwise admissible testimony from qualified witnesses simply because they disagree with the opinion's basis or believe the expert untrustworthy or unreliable.

¶ 60 Finally, there are other solutions available if a judge believes there is a substantial possibility that a jury might be misled or fooled by plausible but very untrustworthy testimony from a dubious expert witness.

Rule 706, Ariz.R.Evid., for instance, permits a judge in such an extraordinary situation to appoint an expert and sets forth the procedure to be followed. *See also MCCORMICK ON EVIDENCE* § 203, at 733-34.

¶ 61 We therefore reject the *Joiner* and *Kumho* interpretations of Rule 702. In doing so, we do not close the door to continuing common-law evolution or refinement of either *Frye* or Rule 702 and will continue to be responsive and receptive to evolving methods of addressing any abuses in the use of expert testimony. *See, e.g.*, Rule 26(b)(4)(D), Arizona Rules of Civil Procedure (limiting number of expert witnesses); Rule 1(D)(4), Arizona Uniform Rules of Practice for Medical Malpractice Cases (same).

SUMMARY AND CONCLUSION

¶ 62 It is no doubt tempting, but potentially quite harmful, to exaggerate the breadth and scope of this decision to support erroneous predictions of the dire consequences that will follow. *See Martone* dissent at pp 79-81. To compare the repressed memory controversy between clinical psychiatrists and psychologists on the one hand and research psychologists on the other to a debate over astrology is, to put it tactfully, quite a stretch. So is the fear that "any expert" can testify to any conclusion, no matter how scientifically unreliable. Our decision, like *Kumho*, does not turn on an attempt to determine whether repressed memory is "scientific" or "unscientific." Plaintiff does not claim her memories are proved true as a matter of scientific fact. *Frye* is applicable when an expert witness reaches a conclusion by deduction from the application of novel scientific principles, formulae, or procedures developed by others. It is inapplicable when a witness reaches a conclusion by inductive reasoning based on his or her own experience, observation, or research. In the latter case, the validity of the premise is tested by interrogation of the witness; in the former case, it is tested by inquiring into general acceptance.

¶ 63 This case turns on a non-scientific issue. As the *Martone* dissent concedes:

In many respects, the phenomenon of repressed memory, whatever its validity, presents a classic problem for the law and science relationship.... [I]t remains woefully short of being empirically verified and, indeed, heralds from a non-rigorous school of psychology in which empirical validation is not a core tenet. The theory of repressed memories has its roots in clinical therapy, a domain in which validity is not a factor of overriding concern....

Martone dissent at ¶ 86 (quoting 1 FAIGMAN, ET AL. § 13-1.5, at 534). We believe the jury must decide what to do about the lack of empirical support. The June 11 Order would not even let the jury hear of the controversy and would, in effect, throw it and the case

out of the courthouse, thus letting the judge decide the dispute if *Frye* were applied, and perhaps even if *Daubert* were applied. But what is gained by that? The need, as Professor Faigman describes it, is this:

[1 P.3d 134]

Repression, in short, is a testable hypothesis, but it has not yet been appropriately tested. Pending satisfactory studies, therefore, the most reasonable scientific position is to maintain skepticism.

Martone dissent at ¶ 88 (quoting 1 FAIGMAN, ET AL. § 13-2.4, at 150 (Supp.1999)).

¶ 64 We agree. The most reasonable position, scientific or unscientific, is to maintain skepticism about Plaintiff's claims. Justice Martone also suggests this case should be tested "under some heightened form of evidentiary scrutiny." Martone dissent at ¶ 88. Again we agree. But we have no doubt there will be very stringent scrutiny by the time able defense counsel finishes cross-examining Plaintiff and her witnesses, including Doctor van der Kolk. We are quite sure also that the nature of the case and the evidence produced by Defendant may well engender some skepticism in the minds of the jurors, just as it did with the trial judge. But as able as this trial judge is, and no matter how well founded his skepticism or ours, we believe the evidentiary testing should come from the adversary system and be decided by the jury. We make no constitutional pronouncement. We simply differ from the dissenters in this: having faith in the jury system, we believe jurors can handle the problem. Whether or not the jury finds Plaintiff's claims well founded, we are willing to indulge the presumption that the jurors will probably be right, or at least as right as the trial judge, and we, might be on this and the many other difficult issues of fact that come before our courts. More important, we believe the result we reach is in keeping with our system of justice and its preference for trial by jury on issues of fact.

¶ 65 Thus, we retain the *Frye* rule but continue to apply it as described in *Hummert*. We reject the *Joiner/Kumho* interpretation of Fed.R.Evid. 702 and continue to apply Ariz.R.Evid. 702 as written and interpreted by our cases. The trial judge's June 11, 1998 Minute Entry Order is vacated. The case may proceed in conformance with this opinion.

CONCURRING: THOMAS A. ZLAKET, Chief Justice, and CHARLES E. JONES, Vice Chief Justice.

JONES, Vice Chief Justice, specially concurring:

¶ 66 I concur and join in the opinion and judgment of the majority but write separately because of the growing debate over the admissibility of expert testimony touching on fields of scientific endeavor under the *Daubert/Kumho* line of cases. *Kumho Tire Co., Ltd. v.*

Carmichael, 526 U.S. 137, 119 S.Ct. 1167, 143 L.Ed.2d 238 (1999); *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993). In the context of childhood sexual abuse, my concern is heightened by *Daubert*'s adverse impact on child victims stemming from the potential exclusion of otherwise relevant evidence.

¶ 67 The issue is uncomplicated. The dissenting authors urge that we adopt *Daubert*, thereby vesting the trial judge with exclusive power to determine, as a matter of law, whether the statute of limitations should bar petitioner's sexual abuse claim on the basis that theories of "repressed memory," "dissociative amnesia," and related mental disorders constitute invalid science.

¶ 68 The problem is this. To adopt *Daubert* will give the trial judge sole power to preclude expert testimony which, in the view of the majority, is both relevant and essential to a proper resolution of the case. Conversely, to admit evidence under *Daubert* depends not on the traditional evidentiary factors of relevance or materiality but on an extraordinary determination by the judge alone as to whether expert testimony, as proffered, accords with scientific principles about which the judge may know little or nothing. This constitutes weighing, rather than a determination of admissibility under the rules. Clearly, evidence weighing is the province of the jury as the trier of fact, not the judge. The great risk under *Daubert* is that the jury may never hear evidence that is both competent and relevant.

¶ 69 I believe application of *Daubert* in the instant case will undermine Rule 702, Arizona

[1 P.3d 135]

Page 492

Rules of Evidence, which states in relevant part:

If ... specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by ... experience, ... may testify thereto in the form of an opinion or otherwise.

(Emphasis supplied.) I can think of no more succinct or accurate description of the testimony and evidence offered by Bessel A. van der Kolk, M.D., than Rule 702 as quoted. His testimony is founded on specialized knowledge and is based on real experience. His qualifications are extensive.

¶ 70 It is my general observation that a range of factual scenarios and a variety of cause and effect circumstances in specialized scientific fields may remain unexplained for generations, as in aspects of cosmic science or in medical or other forms of life science. But it is also true, as a practical matter, that their actual occurrence, repeated time and again, may be well within an expert's specialized knowledge and experience.

Notwithstanding the doubt that may encircle scientific theory, it is actual experience, whether in the laboratory, the clinic, or elsewhere, that has been the *sine qua non* of medical and scientific progress. And it seems to me such experience, under Rule 702, would assist the trier of fact to understand the issues and the evidence in the case at bar. The exclusion of uncertain or doubtful scientific theory is one thing, but the exclusion of specialized knowledge of actual trauma which stems from real experience is quite another.

¶ 71 I would admit the testimony of Dr. van der Kolk without reference either to *Frye* or *Daubert*. *Frye v. United States*, 293 F. 1013 (1923). It should be admitted to the extent it is based on actual experience, both as the factual basis on which to determine applicability of the statute of limitations and as the basis under Rule 702 to explain to the jury the nature of petitioner's claims. Van der Kolk is a trained medical expert with a breadth of experience dealing with substantial numbers of childhood sexual abuse victims. A ruling that would exclude van der Kolk purely on the basis that the trial judge may believe the "science" is uncertain would leave petitioner Logerquist and others like her with little but their individual testimony based on childhood memory, with no opportunity to introduce specialized evidence to explain things actually experienced at a tender age in their lives. This would impair substantial justice. Contrary to the dissent at paragraph 79, any theory of repressed memory, valid or invalid, is easily distinguished from astrology because the former is invariably associated with severe mental or even physical trauma to the victim, whereas the latter involves no trauma and no victim. That is the whole point. Trauma caused by molestation is relevant, and to apply *Daubert* in these circumstances risks immunizing adult molesters against liability for acts of sexual abuse against children.

¶ 72 Petitioner Logerquist alleges that her life has been severely impacted, that sexual assaults on her person were of such traumatic magnitude and incapacitated her emotional and mental self to such an extent that for many years she was unable to cope with or discuss her past or even face life's most essential decisions. In light of the complex medical implications and her young age at the time the alleged events occurred, she alone should not be expected to justify or even explain her symptoms. She claims depression. She was unable to remain employed and underwent years of mental therapy, allegedly necessitated by sexual abuse at the hands of the defendant. While the underlying scientific theories may remain uncertain, it is well known that child victims of sexual molestation by adults suffer profound forms of denial, anxiety, depression, and guilt. Their lives are often left in shock and degradation. Such conditions may endure for years, and experience-based testimony by a trained specialist would assist the jury to decide both the statute of limitations defense and the merits of petitioner's case.

¶ 73 To date, none of petitioner's allegations has been proved. They may never be proved to the satisfaction of a jury, and the statutory period of limitations may still bar her claim. Nevertheless, she should at least be accorded an opportunity to make her whole case.

[1 P.3d 136]

Page 493

¶ 74 My reason in part for joining the majority is a current sense of resistance to the *Daubert* principle because it gives the trial judge, a non-expert in scientific matters, near absolute power to make a one-person determination of what is and what is not valid science. The dissenting justices present a legitimate, well-intentioned argument, but I remain unpersuaded that a judge alone should occupy a scientific fact-intensive role so powerful. For that reason, I remain skeptical of *Daubert* and *Kumho*, at least until a solid measure of acceptable consistency emerges under their application.

MARTONE, Justice, dissenting.

¶ 75 We were asked to decide whether *Frye* or *Daubert* applies to the theory of repressed memory. Instead of choosing, the majority rejects both *Frye* and *Daubert* and abandons the trial court's substantive role in ruling on the admissibility of this sort of evidence. Because I believe that judges can play a valuable role in preventing the abuse of expert testimony and in excluding junk science, I dissent.

¶ 76 In *Logerquist v. Danforth*, 188 Ariz. 16, 23-24, 932 P.2d 281, 288-89 (App.1996), the court of appeals remanded this case to the trial court for an evidentiary hearing on the validity of repressed memory under *Frye*. We denied review. The trial court then held a comprehensive evidentiary hearing and concluded that the relevant scientific community rejects the existence of repressed memory and the theory that such memories can be recalled with accuracy. Logerquist's offer of expert evidence thus failed to pass the general acceptance standard of *Frye*. The court of appeals declined to accept jurisdiction of Logerquist's petition for special action. She petitioned this court to review the following two substantive issues:

1. Does the *Frye* rule apply to this case, or should this court adopt *Daubert*?

2. Did Judge McVey act arbitrarily, capriciously, and/or abuse his discretion in ruling that the existence and accuracy of repressed memory are not generally accepted by the relevant scientific community so that the *Frye* rule was not met here?

Petition for Review at 3. Although the majority answers neither issue, here are the answers to these

questions.

¶ 77 If we were to continue to adhere to *Frye*, then we would affirm the ruling of the trial court. The hearing Judge McVey held under *Frye* was comprehensive and the majority does not take issue with his conclusion that repressed memory is simply not generally accepted in the scientific community. Expert testimony on repressed memory would thus be excluded. If, on the other hand, the court chose this case as a vehicle to adopt *Daubert*, as both parties urged us to do, then the *Frye* hearing would be inadequate and we would need to remand this case to the trial court for reconsideration under *Daubert*.

¶ 78 The majority chooses neither approach. Ironically, the majority does an end-run around *Frye* even as it pays homage to it. And, because the majority does not trust trial judges to properly perform a gatekeeping function, it rejects *Daubert* and avoids remand on this issue.

I.

¶ 79 How does the majority bypass *Frye*? It does so by stating that expert opinion testimony about repressed memory is not based upon scientific theory at all. According to the majority, because *Frye* only applies to scientific theories or processes, and repressed memory is unscientific, general acceptance is irrelevant and the evidence comes in. *Ante*, at ¶ 19. But this analysis is flawed. One would reach the exact opposite conclusion if one believed that repressed memory was not based on a scientific theory. *If*, as the majority asserts, repressed memory has no scientific basis, then, like astrology, expert testimony on it should be excluded. [1] If, on the other hand, the theory of repressed memory is offered as having some scientific validity, then it must be subject to either

[1 P.3d 137]

Page 494

Frye or *Daubert* scrutiny. Here, the theory is offered as having a basis in science. Logerquist's expert, Dr. van der Kolk, [2] planned to testify that amnesia for traumatic events, including sexual abuse, "has been documented in numerous scientific reports" and that the notion is "well accepted in the relevant scientific community." *Ante*, at ¶ 15. Thus, *Frye* is fully applicable.

¶ 80 The majority reaches the quite remarkable conclusion that "*Frye* is inapplicable when a qualified witness offers relevant testimony or conclusions based on experience and observation about human behavior for the purpose of explaining that behavior." *Ante*, at ¶ 30. But observation-based experience and inductive reasoning, *ante*, at ¶ 62, lie at the heart of the scientific method. That expert evidence about human behavior has no basis in science will be astounding news to the medical community. It also means that any psychiatrist,

psychologist, or "human behavioralist" can be called as an "expert" and render any theory of human behavior, however farfetched. This presents a profound danger to our judicial system. Neurobehavioral genetics is an emerging field. The ways in which genes affect the brain and human behavior raise all sorts of issues: the relationship between genes and criminal violence; the relationship between genes and mental disorders; the relationship between genes and behavioral disorders; the relationship between genes and addictive disorders; and the list goes on. See Dean Hamer and Peter Copeland, *Living With Our Genes* (1998).

¶ 81 After today's decision, any "expert" can walk into an Arizona courtroom and testify about human behavior without any threshold showing of scientific reliability. Yet, with a renegade exception, courts that have addressed the admissibility of expert testimony on repressed memory have applied either *Frye* or *Daubert*. Though they reach different outcomes, each applies some form of heightened evidentiary scrutiny. See *Shahzade v. Gregory*, 923 F.Supp. 286, 287 (D.Mass.1996) (finding that the theory of repressed memory is reliable under *Daubert*); *Doe v. Shults-Lewis Child and Family Services, Inc.*, 718 N.E.2d 738, 748-49 (Ind.1999) (concluding that, before the testimony is admitted into evidence, the court must be satisfied that the expert scientific testimony is based on reliable scientific principles); *State v. Hungerford*, 142 N.H. 110, 697 A.2d 916, 920 (1997) (concluding that repressed memories must satisfy a threshold reliability inquiry before being admitted at trial); *State v. Quattrocchi*, 681 A.2d 879, 883-84 (R.I.1996) (concluding that when repressed memory testimony is offered, the trial judge "should exercise a gatekeeping function and hold a preliminary evidentiary hearing outside the presence of the jury in order to determine whether such evidence is reliable").

¶ 82 The majority neglects these cases and, instead, is drawn to *Wilson v. Phillips*, 73 Cal.App.4th 250, 86 Cal.Rptr.2d 204 (1999), a *sui generis* opinion of California's intermediate appellate court. The distinction in *Wilson* (distinguishing expert medical opinion from scientific theories) is contrary to Arizona law and common sense. Expert medical opinions must be based on medical science as it is currently known. A contrary conclusion would reduce medicine to magic.

¶ 83 The majority's reliance upon *State v. Hummert*, 188 Ariz. 119, 933 P.2d 1187 (1997), to support its conclusion that *Frye* does not apply here is misplaced. In *Hummert*, we distinguished between two kinds of evidence. One involved the scientific validity of DNA identification techniques. As to this, we said *Frye* applied. We also said it was generally accepted under *Frye*. The other evidence was expert experience with DNA matches. We allowed opinion evidence concerning the expert's experience with random matches without subjecting that experience to a *Frye* analysis, because the scientific principles that were at the basis of their

personal experience *had already been subjected to a successful Frye analysis.* Thus, under *Hummert*, the theory of repressed memory would first have to satisfy *Frye*. If it

[1 P.3d 138]

Page 495

did, then and only then could an expert offer an opinion based on experience.

¶ 84 So too, in *State v. Lindsey*, 149 Ariz. 472, 473, 720 P.2d 73, 74 (1986), we permitted expert testimony that explained "recognized principles of social or behavioral science which the jury [could] apply to determine issues in the case." The principles were already recognized. Here, of course, we have a very different case. Repressed memory has not been generally recognized. It is a new and controversial theory which attempts to explain the brain's response to trauma under the banner of science. Thus, we should not allow expert testimony based upon personal experience in this area unless and until it satisfies *Frye*.

¶ 85 Nor does *State v. Roscoe*, 145 Ariz. 212, 700 P.2d 1312 (1984) (*Roscoe I*) advance the majority's position. We had to acknowledge error in admitting the dog scent evidence when it turned out that the expert was a "charlatan" and his theory "fabricated." *State v. Roscoe*, 184 Ariz. 484, 489 n. 1, 910 P.2d 635, 640 n. 1 (1996) (*Roscoe II*). We thus erred in *Roscoe I* in allowing the use of this evidence without any preliminary showing of reliability. It is precisely because of cases like *Roscoe I* that the trial court's role as a gatekeeper is so important. [3] The majority's revised reading of *Hummert*, *Lindsey*, and *Roscoe I* casts *Frye* right out of our jurisprudence.

¶ 86 Having shown that *Frye* does apply, here is how we should deal with it. A preeminent treatise on scientific evidence says this about the relationship between repressed memory and the law:

In many respects, the phenomenon of repressed memory, whatever its validity, presents a classic problem for the law and science relationship....[I]t remains woefully short of being empirically verified and, indeed, heralds from a non-rigorous school of psychology in which empirical validation is not a core tenet. The theory of repressed memories has its roots in clinical therapy, a domain in which validity is not a factor of overriding concern. In therapy, support and improved mental health are the predominant outcome measures.

1 David L. Faigman, David H. Kaye, Michael J. Saks & Joseph Sanders, *Modern Scientific Evidence: The Law and Science of Expert Testimony* § 13-1.5, at 534-35 (1997).

¶ 87 There may be no area of contemporary psychiatry and psychology more controversial than the

theory of repressed memory. "Questions are raised about the authenticity of such reported memories, people's ability to recall such memories, the techniques used to recover these memories, and the role of therapists in developing the memories." *Id.* § 13-2.3, at 539. Indeed, the preeminent professor of law and psychiatry at Harvard University notes well the problem of memory, "infantile amnesia" and its effect on the legitimacy of Freudianism itself.

The task of constructing self-descriptions in psychoanalytic therapy also encounters the problem of memory. Everything we have learned in recent years about memory has emphasized its plasticity, the ease with which it can be distorted, and the difficulties of reaching a hypothetical veridical memory. Much of what psychoanalysis considered infantile amnesia may be a function of the reorganizing brain rather than of the repressing mind. All of this makes the task of constructing meaningful histories of desire in the individual more daunting.

If there is no important connection between childhood events and adult psychopathology, then Freudian theories lose much of their explanatory power. If memory cannot be trusted to construct a self-description, what does one do in therapy?

Alan A. Stone, M.D., *Where Will Psychoanalysis Survive: What Remains of Freudianism When its Scientific Center Crumbles?*, Harv. Mag., Jan.-Feb.1997, at 39.

¶ 88 This debate lies at the essence of *Frye*. Repressed memory does not lie within the range of common knowledge. Experts in psychology and psychiatry cannot reach

[1 P.3d 139]

Page 496

agreement about its validity. See *Modern Scientific Evidence* § 13-2.0, at 115-50 (Supp.1999). And, if experts cannot agree about the validity of repressed memory, how do we pass this question to the jury without first reviewing its reliability under some heightened form of evidentiary scrutiny? That is what *Frye* is all about. Here is what some experts conclude:

Repression, in short, is a testable hypothesis, but it has not yet been appropriately tested. Pending satisfactory studies, therefore, the most reasonable scientific position is to maintain skepticism.

Id. at 150. The trial court properly excluded this theory under *Frye*.

II.

¶ 89 In rejecting the application of *Frye* to repressed

memory, the majority construes Rule 702, Ariz. R. Evid., governing the admissibility of expert testimony, as though the trial court had no role in the process. This, of course, requires the majority to reject *Daubert* because *Daubert* concluded that Federal Rule 702, identical to our Rule 702, imposes a gatekeeping role on the trial judge to ensure that only reliable expert testimony is admitted.

¶ 90 As the majority acknowledges, both sides to this case ask us to adopt *Daubert*. I believe the time has come to accept that invitation. *Daubert* and *Kumho* apply a consistent and integrated approach to Rule 702. We copied our Rule 702 from Federal Rule 702. While we certainly have the authority to read it differently, there is no good reason to do so. *Frye* can operate to exclude evidence which ought to be admitted. And, it might admit evidence which ought to be excluded. This is especially true if the definition of the relevant scientific community is quite narrow. For example, the community of astrologers could simply say that astrology is generally accepted among them. Under this approach, horoscopes would be admissible.

¶ 91 *Daubert*, on the other hand, points out that scientific testimony is admissible only if it is both relevant and reliable. Rule 702 assigns the trial judge the legal task of determining both the relevance and the reliability of scientific foundation. As noted in *Daubert*, "in order to qualify as 'scientific knowledge,' an inference or assertion must be derived by the scientific method." *Daubert*, 509 U.S. at 590, 113 S.Ct. at 2795. Thus, scientific validity must precede evidentiary reliability. See *id.*

¶ 92 *Kumho* fills out *Daubert* quite nicely. By not limiting the judicial role to scientific evidence, one avoids the abuse that the majority approves here—"any expert could sidestep scrutiny by characterizing the testimony as 'experience-based.'" Tracy A. Paulauskas, Note, *Volume III of the Daubert Trilogy: Kumho Tire Co. v. Carmichael*, 39 *Jurimetrics J.* 443, 450 (1999).

¶ 93 The majority's treatment of *Daubert*, *ante*, at pp 33-61, is based upon a variety of views that I simply do not share. First, its criticism of the United States Supreme Court's analysis and its characterization of its opinion as a "jury argument," *ante*, at ¶ 40, are inappropriate. Second, the majority shows a lack of confidence in trial judges that is simply without foundation. To suggest that trial judges are in no better position than jurors to separate junk science from good science is, I believe, an abdication of a core role of the judge in our system of justice. To suggest that judges "have little or no technical training" and have no time for hearings on the admissibility of expert testimony, *ante*, at pp 48-49, is unfounded. Rare is the judge who has not attended formal programs involving scientific evidence. Indeed, this court's Judicial College just sponsored a "Genetics in the Courtroom" judicial education program based upon the idea that judges do have a significant gatekeeping role,

whether operating under *Frye* or *Daubert*. See Arizona Supreme Court, *Arizona/Southwest Conference on Genetics in the Courtroom* (Feb. 8-11, 2000). [4] This is consistent

[1 P.3d 140]

Page 497

with a growing national awareness that judges are becoming more literate in matters of science. See, e.g., Stephen Breyer, *The Interdependence of Science and Law*, *Judicature*, Jul.-Aug. 1998, at 24.

¶ 94 And, they certainly do have time for hearings under Rule 104, Ariz. R. Evid., to determine the preliminary question of the admissibility of evidence. In my experience, they do it every day. Today, the majority reads Rule 104(a) out of our Rules of Evidence. That rule plainly assigns to the trial judge the task of determining the preliminary question of the admissibility of evidence. ("[T]he admissibility of evidence shall be determined by the court.") And in holding hearings, the trial judge, unlike the jury, "is not bound by the rules of evidence." Rule 104(a), Ariz. R. Evid.

¶ 95 Nor do I subscribe to the majority's new found dictum that the Arizona Constitution prohibits trial judges from determining the reliability of the scientific foundation for an expert's testimony. If this is true, how then have we applied *Frye* at all? The majority offers no support for its remarkable contention. Article 2, § 23 of the Arizona Constitution does not address the scope of trial by jury. It simply states that the right of trial by jury shall remain inviolate. In *Brown v. Greer*, 16 Ariz. 215, 221, 141 P. 841, 843 (1914), we held that the constitution does not grant a right to trial by jury but simply preserves any right that existed at the time the constitution was adopted. But our own judges, and those across America, have always determined preliminary questions of admissibility. The jury gets to decide factual disputes after evidence is admitted pursuant to the rules of evidence. Jurors do not get to decide factual disputes that go to the admissibility of evidence. The judge does that under Rule 104(a), Ariz. R. Evid. The majority's view of the respective roles of judge and jury in the admissibility of evidence is extraordinary. Judicial rulings on the admissibility of scientific evidence under *Daubert* / *Kumho* would no more violate the Arizona Constitution than do similar rulings violate the Seventh Amendment to the Constitution of the United States. Bert W. Rein, *The Role of the Jury in the Evaluation of Scientific Evidence*, 9 *Kan. J.L. & Pub. Pol'y* 28, 31 (1999).

¶ 96 So as not to belabor the point, I stop here. Suffice it to say, there are almost no views or opinions expressed in the majority opinion that I share.

III.

¶ 97 If *Frye* is still the law of Arizona, then the trial

court's findings in this case are unassailable. The theory of repressed memory has not found general acceptance in the scientific community. Thus, it was proper for Judge McVey to exclude expert opinion testimony on this subject. The majority's claim to adhere to *Frye* and yet avoid this result is unfathomable. On the other hand, I would, as both sides have suggested, replace *Frye* with *Daubert* and remand this case for reconsideration in light of *Daubert*.

McGREGOR, Justice, dissenting:

¶ 98 Although I agree with much of Justice Martone's dissent, I write separately to emphasize several areas of concern that today's majority opinion raises.

¶ 99 I am concerned about the tendency of the decision to isolate Arizona's courts from the mainstream of judicial analysis. All federal courts, of course, must apply *Daubert* [1] and *Kumho* [2] in interpreting and applying Federal Rule of Evidence 702, which is identical to Arizona Rule of Evidence 702. In addition, a large majority of states also follow

[1 P.3d 141]

Page 498

Daubert or a similar standard. See Heather G. Hamilton, *The Movement from Frye to Daubert: Where Do the States Stand?*, 38 JURIMETRICS J. 201 (1998) (noting that by December 15, 1997, thirty-three states had adopted *Daubert*).

¶ 100 Arizona, therefore, now falls within a tiny minority of jurisdictions that have chosen to adopt a unique interpretation of Rule 702. I see two significant negative results. First, evidentiary rulings that could significantly affect the outcome of litigation will differ depending upon whether an action proceeds in state or in federal court. We have tried to avoid such distinctions. Second, because our approach diverges from that taken in most jurisdictions, Arizona's courts will lose the advantage of being able to learn from and follow the reasoning of other courts as they develop and apply Rule 702.

¶ 101 I also am concerned that, by rejecting *Daubert*, we lose the flexibility needed to admit evidence based upon reliable, but newly-developed, scientific principles. Although the majority describes our experience with *Frye* [3] as having been "not bad," Op. at ¶ 47, *Frye* has been frequently criticized because the delay between the development of knowledge and its ability to satisfy the "general acceptance" standard deprives the courts of reliable evidence that should be placed before the trier of fact. The time lag between progress and the ability to satisfy *Frye* becomes more important as our scientific knowledge multiplies in ever shorter intervals. In Arizona, unlike most jurisdictions, new data and principles, regardless of their validity and

reliability, will be excluded from our courts until they attain general acceptance within the relevant scientific community. *Frye*, despite its shortcomings, [4] may have provided an adequate basis for testing scientific evidence in the past. I do not think, however, that test best responds to the challenges facing courts today.

¶ 102 I also question whether the distinction the majority makes between "scientific" evidence, which must meet the *Frye* test to be admissible, and "non-scientific" evidence, which need not comply with *Frye*, rests on a firm basis. According to the majority, evidence is "scientific" if an expert witness reaches his or her conclusion through the use of deductive reasoning, and not scientific if the expert relies upon inductive reasoning. Op. at ¶ 62. I do not believe that distinction will prove useful and suspect it will produce inexplicable evidentiary rulings. For example, research scientists tell us that certain components of human behavior seem to be related to, and may be caused by, genetic characteristics. In an action similar to that before us, if one expert, relying upon his observations, reaches a conclusion about a party's "human behavior" by reasoning inductively, his testimony would be admissible so long as his credentials are acceptable. But if another expert witness, with an equally impressive curriculum vitae, concludes that the plaintiff's human behavior could be explained by reasoning deductively from known principles of genetics, that expert's testimony would be subject to the *Frye* analysis. The admissibility of testimony from two expert witnesses about the same subject—a litigant's human behavior—would be tested against two different standards. And, as noted above, whether each expert can testify will depend in large part upon whether the action proceeds in state or in federal court. I see no benefit to trial courts or litigants from following a path that leads to such a result.

¶ 103 Moreover, unlike the majority, I would not permit the admission of unreliable evidence in the hope that the adversary process

[1 P.3d 142]

Page 499

will disclose its lack of validity. I do not think that allowing a jury to hear unreliable, invalid "expert" evidence benefits either our judicial system or the litigants. Under the approach of *Daubert*, which the majority rejects, expert testimony can be admitted only if it is based on reliable facts or data and on sound scientific methods and valid procedures. 509 U.S. at 592-93, 113 S.Ct. at 2796. If expert testimony cannot meet those criteria and, therefore, does not rest on a reliable basis, I think it unlikely its probative value could ever outweigh the danger of unfair prejudice, the likely confusion of issues, or the likelihood the jury will be misled. See ARIZ. R. EVID. 403. "The probative value of scientific evidence ... is connected inextricably to its reliability; if the technique is not reliable, evidence derived from the

technique is not relevant." Paul C. Giannelli, *The Admissibility of Novel Scientific Evidence: Frye v. United States, a Half-Century Later*, 80 COLUM. L. REV. 1197, 1235 (1980). We can justify admitting unreliable, invalid evidence only if we are willing to substitute a trial judge's analysis of an expert witness's credentials for the judge's analysis of the reliability of the data and methods used to produce the expert's testimony.

¶ 104 The majority's concerns, it seems to me, derive from an overly-broad interpretation of *Daubert/Kumho*. The majority repeatedly asserts that, if we adopt *Daubert/Kumho*, the trial judge will be permitted to evaluate the reliability and credibility of an expert witness and will determine the weight to give his or her testimony. Op. at pp 44, 51-54. *Daubert*, however, focuses not on the credibility of a witness, but upon the scientific validity of the proffered evidence. 509 U.S. at 590, 113 S.Ct. at 2795. The trial judge tests not the believability of an expert witness, but rather the reliability of the witness's methodology. Unless we conclude that permitting a jury to hear a credible witness testify about unreliable, invalid "science" somehow assists the truth-finding function, a conclusion I find untenable, we should not hesitate to adopt the *Daubert* approach.

¶ 105 For those reasons, I would adopt the *Daubert/Kumho* approach and remand for a hearing applying those standards.

[1 P.3d 143] APPENDIX A

(Image Omitted)

[1 P.3d 144] (Image Omitted)

[1 P.3d 145] (Image Omitted)

[1 P.3d 146] (Image Omitted)

[1 P.3d 147] (Image Omitted)

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[1 P.3d 150] (Image Omitted)

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[1 P.3d 153] (Image Omitted)

[1 P.3d 154] (Image Omitted)

Notes:

[1] The second question accepted was whether, assuming

Frye applied, the trial judge abused his discretion by concluding the theory of repressed memory, post-traumatic stress disorder, or dissociative amnesia did not meet the general acceptance test. The cases have split on that question. See Martone dissent at ¶ 81. From the record, one might conclude that in finding a lack of general acceptance, the judge gave undue weight to the views of research psychologists and too little to those of clinicians—psychiatrists and psychologists—who work in the field. But we need not resolve the problem because we conclude that *Frye* was inapplicable.

[2] That literature is quite conservative, consisting of a long list of references to articles written by qualified authorities and published in authoritative texts such as the DSM-IV, peer-reviewed American journals such as COMPREHENSIVE PSYCHIATRY (an article on post-traumatic stress disorder in Vietnam veterans) and HARVARD REVIEW OF PSYCHIATRY. Listed also were authoritative foreign publications such as REVUE GENERALE DES SCIENCES (France), LANCET (Britain), and the Proceedings of the Royal Society of Medicine (Britain).

[3] The trial judge was probably referring to lack of corroboration in some of the cases reported in the literature; however, there may be corroborative evidence in the present case. Following publication of a newspaper article about this case, two women came forward and reported other acts allegedly committed by Defendant. Defendant moved to preclude the women's testimony, claiming it was evidence of habit, character, or propensity and excludable under Rules 403 and 404, Ariz.R.Evid. Plaintiff argued the evidence was admissible under Rule 404(c)(1)(C). So far as we can tell, the motion was not ruled on. We do not address admissibility except to note that Rule 404(c)(1)(C) applies in both civil and criminal cases and permits proof of other acts of an aberrant sexual nature to prove *propensity* to commit the act charged. It is often so applied in criminal cases involving alleged sexual crimes.

[4] See also an excellent discussion of the changes the three cases make in the law of evidence and the problems resulting in an article by Justice Joseph T. Walsh of the Delaware Supreme Court: *Keeping the Gate*, 83 JUDICATURE 140 (1999).

[5] Indeed, Justice Blackmun's dissent suggested this. He stated that the majority opinion allowed admission of evidence when the members of the expert's profession, the literature, and the research data established that such predictions are wrong two out of three times. *Barefoot*, 463 U.S. at 920, 103 S.Ct. at 3408-09 (Blackmun, J., dissenting). Thus, Justice Blackmun suggested, a "greater reliability" standard should be imposed in a capital case than in "a routine lawsuit for money damages." *Id.* at 916, 103 S.Ct. at 3407. It is interesting that Justice Blackmun was the author of the majority opinion in *Daubert*.

[6] It should be noted that Professor Gottesman represented the losing litigants in both *Daubert* and *Joiner*.

[7] Cf. Kenneth J. Chesebro, *Galileo's Retort: Peter Huber's Junk Scholarship*, 42 AM.U.L.REV. 1637 (1993).

[8] See, e.g., *State v. Gortarez*, 141 Ariz. 254, 262-66, 686 P.2d 1224, 1232-36 (1984) (excluding "voiceprint" evidence in criminal trials); *State ex rel. Collins v. Superior Court*, 132 Ariz. 180, 193-211, 644 P.2d 1266, 1279-97 (1982) (hypnotically induced testimony), reaffirmed and clarified in *State ex rel. Neely v. Sherrill*, 165 Ariz. 508, 799 P.2d 849 (1990); *State v. Mena*, 128 Ariz. 226, 231-32, 624 P.2d 1274, 1279-80 (1981) (hypnotically induced testimony); *Valdez*, 91 Ariz. 274, 371 P.2d 894 (polygraph).

[9] See, e.g., *Hummert*, 188 Ariz. 119, 933 P.2d 1187 (DNA match observations); *State v. Baltzell*, 175 Ariz. 437, 441, 857 P.2d 1291, 1295 (App.1992) ("occupant kinematics" evidence); *Bible*, 175 Ariz. 549, 858 P.2d 1152 (DNA evidence); *Troutman v. Valley Nat'l Bank*, 170 Ariz. 513, 518-19 & n. 2, 826 P.2d 810, 815-16 & n. 2 (App.1992) (thermogram diagnostic test); *State v. Velasco*, 165 Ariz. 480, 486-87, 799 P.2d 821, 827-28 (1990) (silica gel blood alcohol test); *State v. Beaty*, 158 Ariz. 232, 241-42, 762 P.2d 519, 528-29 (1988) (phosphoglucose blood test), *cert. denied*, 491 U.S. 910, 109 S.Ct. 3200, 105 L.Ed.2d 708 (1989); *State v. Superior Court*, 149 Ariz. 269, 718 P.2d 171 (1986) (horizontal gaze nystagmus testing); *Starr v. Campos*, 134 Ariz. 254, 256-58, 655 P.2d 794, 796-98 (App.1982) (remanding for further consideration admissibility of computer accident analysis).

[10] See, e.g., *State v. Johnson*, 186 Ariz. 329, 922 P.2d 294 (1996) (general acceptance of restricted fragment length polymorphic (RFLP) procedure for testing DNA and modified ceiling method of statistical probability analysis); *State v. Bogan*, 183 Ariz. 506, 905 P.2d 515 (App.1995) (RFPD procedure in DNA testing and match opinions on plant specimens admissible in sexual assault prosecution).

[11] Even a cursory excursion into the history of toxic tort litigation will prove this statement to be quite modest. See, e.g., *Anderson v. W.R. Grace & Co.*, 628 F.Supp. 1219 (1986), the case on which the book and movie *A Civil Action* were based; see also the history of the tobacco litigation, in particular PETER PRINGLE, *CORNERED: BIG TOBACCO AT THE BAR OF JUSTICE* (1998), especially chapter 6, entitled *The Sweet Smell of Gain*.

[12] A recent court of appeals memorandum decision illustrates the problems that adoption of *Daubert/Kumho* would create. In *Loza v. Palermo*, an automobile accident case, the defense offered expert opinion from a

bioengineer that the low-impact collision and motions resulting from it were insufficient to produce any trauma under the witness' theory of injury mechanics. The court of appeals held that the trial judge properly allowed this testimony because the witness was qualified by training and experience and thus permitted to testify under Rule 702. No one raised a *Frye* objection, and no *Frye* hearing was held, no *Daubert* claim was made, and no *Daubert* hearing, necessarily including general acceptance, was held. No. 2 CA-CV 98-0162 (Ariz.Ct.App., July 29, 1999). We shudder to think of the time that would be spent on cases such as *Loza* were we to adopt *Kumho*.

[13] A seriously inaccurate statement in Justice Martone's dissent requires rebuttal despite its marginal relevance to this, or any, issue. Justice Martone asserts that this court recently sponsored a judicial education conference "based upon the idea that judges do have a significant gatekeeping role, whether operating under *Frye* or *Daubert*." Martone dissent at ¶ 93. This court has never sponsored anything based on such a premise. The quoted description of the conference was contained in an invitation Justice Martone sent interested judges on the letterhead of the Judicial College of Arizona. The letter was not first submitted to the court, and the quoted language was not approved by the court.

The attempt to buttress the dissent's argument in such a manner is not only irrelevant but unavailing. There are 180 fulltime judicial officers sitting on Arizona's superior court bench. According to all reports, the conference--Genetics in the Courtroom--was quite worthwhile. But according to our judicial college staff, only thirty-four *Arizona* trial judges (less than twenty percent of our superior court bench) attended the conference. City magistrates and justices of the peace were not even invited, though they encounter a good deal of cutting-edge science in drunk driving and similar cases. Judicial law clerks and staff attorneys were not invited and not permitted to attend. The view that all judges are eager to be trained on scientific issues, like the benign view of *Kumho*, is, I fear, Panglossian at best.

[14] The data actually provide little support for the view that jurors are incompetent to deal with complex cases and hard issues. See, e.g., Joe S. Cecil, Valerie P. Hans, and Elizabeth C. Wiggins, *Citizen Comprehension of Difficult Issues: Lessons from Civil Jury Trials*, 40 AM.U.L.REV. 728, 744-45, 764 (1991), and the exhaustive notes supporting the authors' conclusions.

[1] The majority denies the scientific basis of repressed memory in order to bypass *Frye*. Thus, contrary to Justice Jones' assertion, *ante*, at ¶ 71, it is the majority, not I, that puts repressed memory in the same category as astrology.

[2] By cluttering the *Arizona Reports* with his resume, the majority fails to distinguish between Dr. van der Kolk's qualification as an expert, which is not in dispute, and the theory he advances, which is the heart of the

dispute. We would not allow a Nobel laureate in physics to testify that, based upon his experience, the earth is flat.

[3] Ironically, the majority notes that in *Roscoe I*, we stated that *Frye* would apply to the theories of Freud. *Ante*, at ¶ 22. Yet the theory of repressed memory is grounded in Freud's theories. If Dr. van der Kolk's testimony is based upon Freud, how does it escape *Frye* scrutiny?

[4] Justice Feldman tries to separate himself from the Judicial College of Arizona, *ante*, at ¶ 50, n. 13, but as a former board member of the College, he knows that neither its work nor the work of its parent, the Arizona Judicial Council, comes to the five members of this court. With rare exception, the only matters that come before the five members of this court are cases, rules, and some administrative issues.

The number of participants in the conference was limited by the size of the grant from the United States Department of Energy. Contrary to Justice Feldman's assertion, 63 judges attended along with 30 scientific faculty.

Justice Feldman complains about the letter of invitation, but he did not complain about its language when he received the letter and chose not to attend the conference. At all events, why hold such a conference if judges have no role in the admission or exclusion of scientific evidence?

[1] 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993).

[2] 526 U.S. 137, 119 S.Ct. 1167, 143 L.Ed.2d 238 (1999).

[3] 293 F. 1013 (D.C.Cir. 1923).

[4] Commentators and courts criticized *Frye*

for its difficulty of application due to the inherent vagueness of the concept of "general acceptance," its susceptibility to manipulation, the inconsistent results it generates, its overly conservative exclusion of relevant evidence, the tendency of courts to rely on previous judicial assessments of scientific theories and techniques rather than their own evaluations, and the documented admission of evidence satisfying *Frye* but subsequently deemed unreliable.

Richard Nahas, *Daubert v. Merrill Dow Pharmaceuticals, Inc. Requiem for Frye: The Supreme Court Lays to Rest the Common Law Standard for Admitting Scientific Evidence in the Federal Courts*, 29 NEW ENG. L. REV. 93, 101-02 (1994) (citations omitted).
